THE PAPER INDUSTRY
and PAPER WORLD
AN EDUCATIONAL NEWS MAGAZINE — FEBRUARY, 1939

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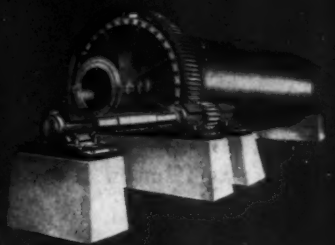

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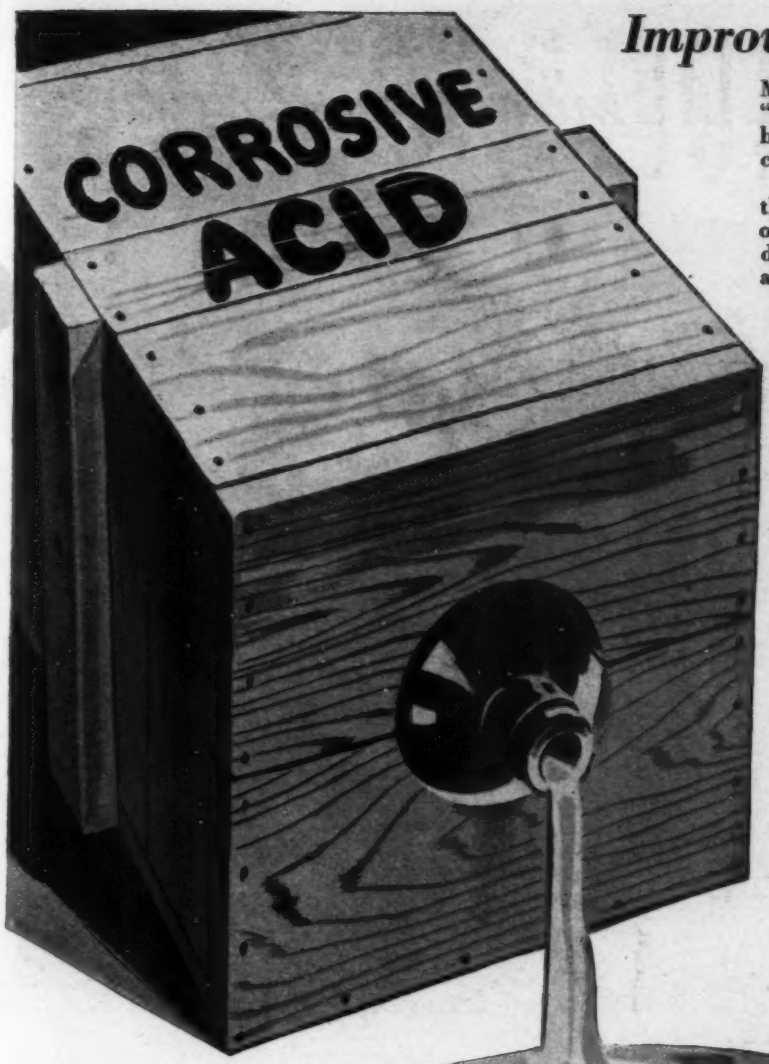

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TOUGH . . . TILL I MET

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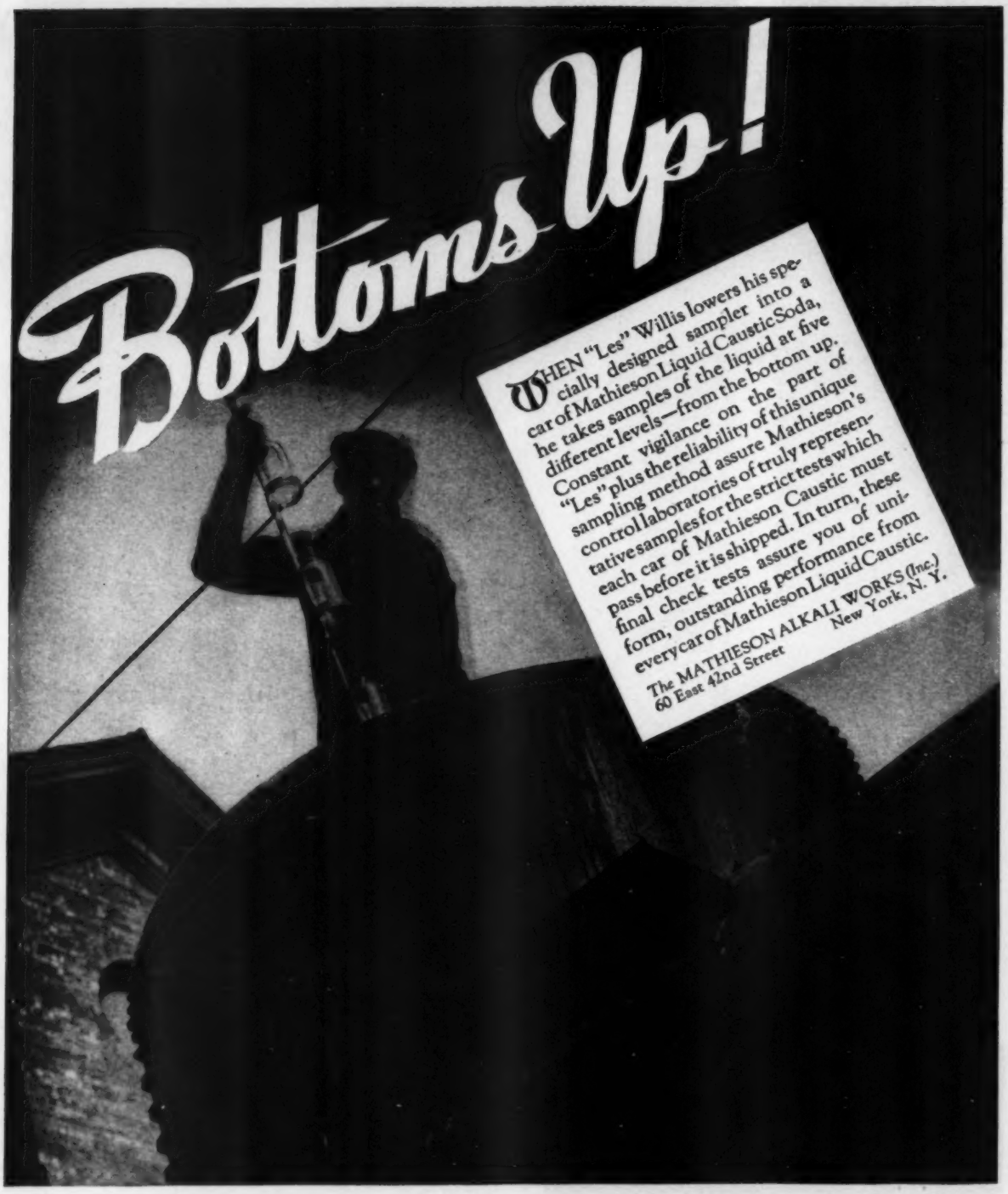
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THE PAPER INDUSTRY and PAPER WORLD

VOLUME 20 **NUMBER 11** **FEBRUARY, 1939**

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Paper Warehouse, The National Cash Register Company, Dayton, O

BALANCED BUDGETS

It is hard to keep within budget limits for new construction or equipment work unless the problems involved are adequately studied, and preliminary appropriation figures carefully and accurately prepared. With twenty years' experience in the paper industry, our specialist engineers investigate sites, develop plot plans, make production layouts, and closely estimate production and construction costs. We build and equip complete new plants or additions, ready to operate within pre-established budget limits. Excellent cost records from other construction in your industry, already completed or currently under way, enable us to make careful, accurate budget figures for you quickly. Our preliminary suggestions, based upon helpfulness to many other important manufacturers, are yours without cost or obligation to you, if you will communicate with our Cleveland or New York office.

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This reminds us of Black-Clawson-Shartle paper mill machinery. When one sees it breaking all kinds of economy and performance records in scores of mills, one often forgets the years of work that preceded its construction. Performance of this B-C-S machinery is all-important to you, of course, but credit must be given to scientific engineering.

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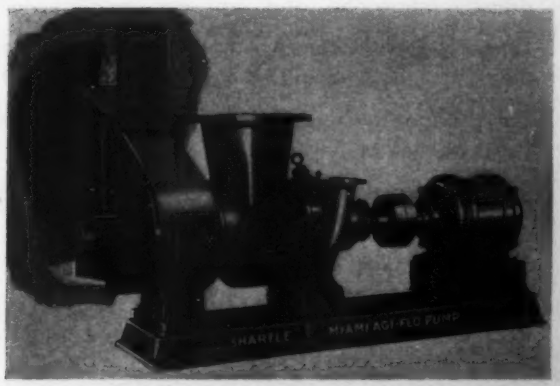
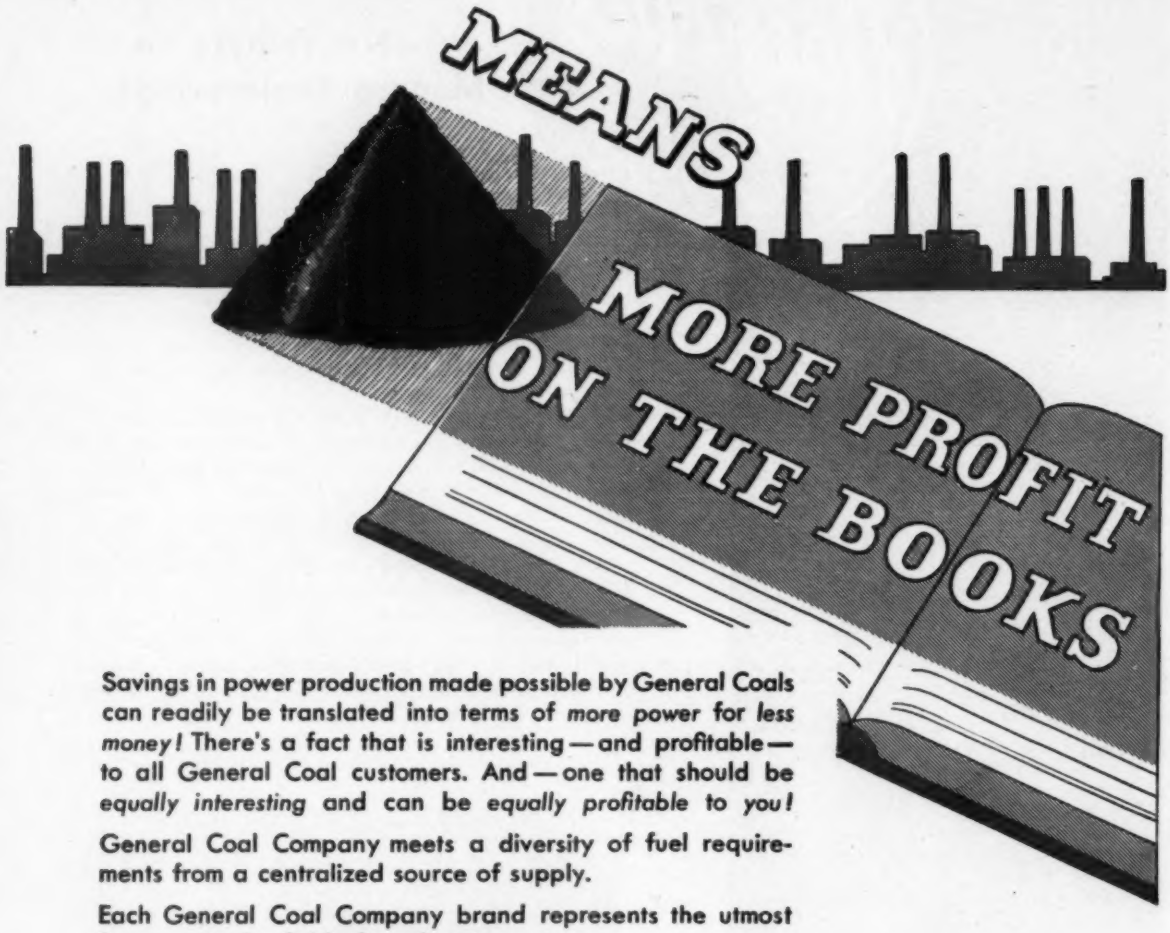


Miami Agi-Flo Pump . . . thorough chest agitation . . . no stratifying . . . uniform volume. All with one motor on less power.

BLACK-CLAWSON SHARTLE BROS.

MORE POWER IN THE COAL PILE



Savings in power production made possible by General Coals can readily be translated into terms of *more power for less money!* There's a fact that is interesting — and profitable — to all General Coal customers. And — one that should be *equally interesting* and can be *equally profitable to you!*

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Each General Coal Company brand represents the utmost for a particular field of application.

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Remember — that more power in the coal pile means *more profit on the books!*

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TRADE WINDS

INTERNATIONAL GIVES UP ITS POWER OPERATION

THE International Paper & Power Company has completed plans for the segregation of its $500,000,000 power interests from its $250,000,000 in paper and related operations, and to give up entirely all power company operations.

This was the announcement made at Washington on Tuesday, January 31, and on the same day at a meeting in Boston, the stockholders took the necessary steps to effect the changes which had been agreed upon with the Securities and Exchange Commission.

The details of the sale of its utilities interests will be in the hands of three trustees, Redfield Proctor of Proctor, Vermont, former governor of that state; C. Brooks Stevens of Lowell, Massachusetts, and Henry G. Wells of Haverhill, Massachusetts.

The segregation involves the following six-point program:

1) International Paper & Power and International Paper will transfer to the liquidating trust all the voting securities held in the International Hydro-Electric System and Olcott Falls Co., a small operating concern.

2) The liquidating trust will register under the holding company act of 1935.

3) International Hydro-Electric will withdraw its application for exemption from the holding company act and register as a holding company.

4) The voting trust which holds the securities of New England Power Company will be terminated and 88 per cent of the voting shares will be returned to Hydro-Electric.

5) Gatineau Power Company will ask exemption as a foreign subsidiary of Hydro-Electric.

6) Machinery for carrying out the segregation will be prepared by the liquidating trustees. This plan will call for the sale of the utilities securities.

According to the announcement, made by Chairman Douglas of the S.E.C., the liquidating trust is established to make possible the disposal of the far-flung power interests of International without losses due to forced sale, it being expected that the five year period allotted will permit an orderly separation of the power and paper interests formerly a joint International organization.

C-Z BUYS MILL AND ERECTS LAB.

The Camas (Washington) plant of the Tissue Company, Saugerties, New York, has been purchased by the Crown-Zellerbach Corporation and all employees were transferred to the payroll of the corporation's Camas plant, the Crown Willamette Paper Company. The sale involved napkin and embossing machinery and the company's business, confined mostly to the Pacific Coast. It is Crown-Zellerbach's first napkin plant.

C-Z also has announced plans for erecting in Camas, a modern laboratory building to house the central technical department of the company. The building will be located on the property of the Crown Willamette Company. Plans call for a one-story brick structure, 44x120 feet. It will house two large laboratories, a research department for Western Waxed Paper Company (a C-Z subsidiary), a library, humidity room, cold room, photographic dark room and offices. It will be the scene of research for all of Crown-Zellerbach's operations and when completed will be one of the finest laboratories in the paper industry.

◆

CANADIAN COURT RULES AGAINST CELOTEX CORP.

On January 26, Justice A. K. Maclean ruled in the Exchequer Court in Canada that the Donnacona Paper Company may legally manufacture and sell acoustical board in Canada. The judgment in the patent case also held that the Celotex Corporation of Chicago could export into Canada sound board made of bagasse fiber. The Donnacona firm will make the product from wood fiber material.

The case arose from an appeal by the Celotex organization against the right of the Donnacona Paper Company to manufacture sound board in Canada. The Chicago firm claimed that it was the licensee of patents for this material and it was alleged that it had never worked these patents in Canada and had refused a license to a Canadian firm to manufacture and sell the product in Canada.

Under the patent act, this failure to develop the invention in Canada was considered an abuse of exclusive patent rights which might be remedied by application to the Commissioner of Patents. The Donnacona company had made application and the license had been granted. The Canadian court upheld the license award and assessed costs against the Celotex Corporation.

◆

DAIRY SUES TO SERVE MILK IN PAPER CARTONS

A suit to restrain the City of Chicago from interfering with the use of paper milk containers was filed recently in the Federal District Court by the Fieldcrest Dairies, Inc., a subsidiary of the Dean Milk Company. The suit avers that the acting president of the board of health and the board of health itself have consistently refused to allow sale of milk in paper containers. The dairy company charged that the city ordinance is discriminatory and hence unconstitutional.

Several companies have been selling milk in paper containers throughout Chicago's suburbs. The companies offering these containers said that they were more economical and easier to handle than glass bottles. The Fieldcrest company, according to the *Chicago Tribune*, stated that refusal to allow use of paper cartons had no basis from a health and sanitary viewpoint, pointing out that paper containers are permitted under the standard milk ordinance of the United States Public Health Service and the regulations of the state Health Department.

CONSTRUCTION OF SOUTH'S FIRST NEWS MILL BEGINS

A NEWSPRINT mill in the South —long a dream of Southern publishers and paper manufacturers and envisaged for years by chemists and technicians—is about to become a reality. On January 15, 1939, ground was broken in Lufkin, Texas, for the erection of a $6,000,000 four-unit newsprint mill, the first to be erected in the Southland.

With the turning of the first shovelful of dirt by E. L. Kurth, president of Southland Mills, Inc., which firm will operate the new plant, there was recalled the far-seeing prophecy of the late Dr. Charles H. Herty, who aided so materially in developing the process which now makes a Southern newsprint industry possible. When told, early in June, of the intention of Southern publishers to erect a newsprint mill, the eminent scientist said: "I know, and speak with absolute confidence, that with the success of that mill there is going to come a new period of industrial activity in the South such as the recent movement of the kraft mills."

Actual construction work on the mill already has been started on Herty Site, three miles east of Lufkin on the A. & N. R. Railroad. The construction contract was awarded to Merritt-Chapman & Scott Corporation of New York City. Construction work will be under the direction of George F. Hardy, consulting engineer.

E. L. Kurth, president of Southland Paper Mills, breaks ground for the new $6,000,000 newsprint plant.

Officials of Southland Paper Mills

All directors and officials of the new Southland Paper Mills, Inc., were present at the first board meeting in Lufkin, Texas, January 9. Front row (left to right)—Arthur Temple, Texarkana, vice-president; E. L. Kurth, Lufkin, president; Albert Newcombe, New York, treasurer, and J. H. Kurth, Jr., Lufkin, director. Center row: Directors Paul T. Sanderson, Trinity; Alex Weisberg, Dallas, and W. C. Trout, Lufkin; A. G. Ready, resident engineer, and T. A. Work, general manager. Back row: Directors E. K. Gaylord, Oklahoma City, and E. M. (Ted) Dealey, Dallas; S. W. Henderson, Jr., secretary; Lloyd Schenck, office manager, and C. B. Edwards, comptroller. E. L. Kurth, Temple, and Newcombe also serve on the board of directors in addition to their executive posts.

Construction equipment has been mobilized for shipment to the plant site, and executives of the New York construction firm have been on the ground to arrange for the employment of local labor and prepare the field and construction organization. Specifications and purchase orders for construction materials are ready for release, and the program laid out so that with the breaking of ground, construction can proceed at top speed to assure completion within one year.

The mill buildings, power plant and equipment alone will cost $3,750,000 and the total project approximately $6,000,000. Construction work will provide work for about 700 men for approximately a year.

The newsprint mill will have a capacity of 150 tons per day. The terms under which chemical pulp for the mill will be purchased from the Champion Paper & Fibre Company were announced in New York when a conference was held between the officers of the Southland company and officials of the Perkins-Goodwin Company, which will be the exclusive selling agent for the new mill. Instead of sulphite, the chemical fiber, in a ratio of about 20 per cent, will be semi-bleached kraft from the Champion company's mill at Pasadena, Texas. For the first year, dating from October 1, 1939, the price will be $38.25 f.o.b., Pasadena, and after that time, for four years, the pulp will be billed at cost, plus 15 per cent. The new company will produce its own groundwood pulp.

A ten-year contract for fuel has been placed with the United Gas Pipe Line Company for natural gas.

One machine, 234 inches in width, will be the first unit of the new mill, but the speed will be dependent upon the success found in this initial use in commercial quantities of kraft pulp for newsprint. A group of newspapers has contracted for the entire output of the mill for a period of five years.

The board of directors of Southland Mills, Inc., met for the first time on Monday, January 9. The group heard reports on the progress of the project, ratified existing contracts and authorized a call for the first installment of cash subscriptions as of January 20.

C. B. Edwards, Lufkin, was chosen officially as comptroller and Lloyd Schenck of Dallas was named office manager. Appointment of T. A. Wark as general manager and S. W. Henderson as secretary was approved. Other officers of the company are Arthur Temple, vice-president, and Albert Newcombe, treasurer. Members of the board include Mr. Kurth, J. H. Kurth, Jr., W. C. Trout, Ted Dealey, Alex Weisberg, Mr. Temple, and Paul T. Sanderson.

The Modern Touch

—with Precision Accuracy and Automatic Spacing

➡ Modern
➡ Business
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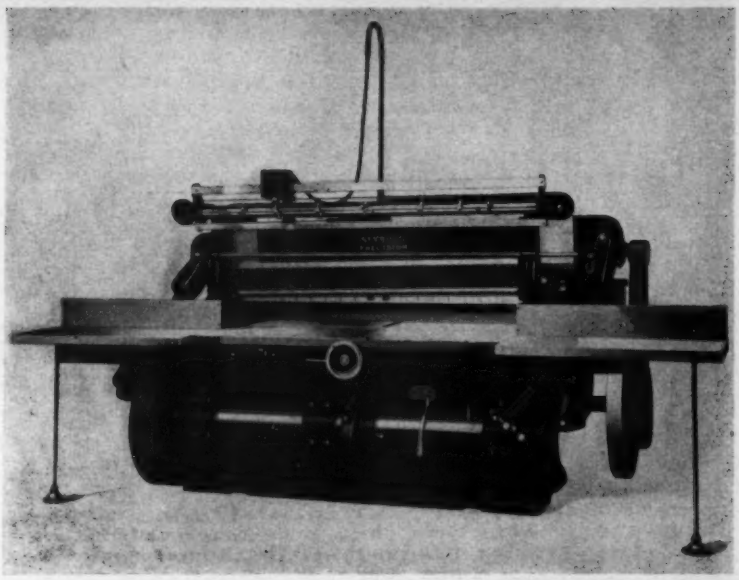
progressive equipment because it reflects the surge for greater profits. This is especially true in the splitting of piles in today's Paper and Pulp mills.

The Seybold Precision Mill Automatic Spacer Paper Cutter gives to mill production that modern touch which insures accurate piles and in such volume as brings continued profits.

The back gauge on this Seybold Mill Spacer moves instantly to the next desired cutting position and stops automatically. Actually a dual purpose machine. A snap of the switch and it becomes a standard Trimmer.



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HANDLING PAPER AT THE TRIBUNE PLANT

CHICAGO'S leading newspaper, the *Tribune*, recently completed a series of articles in the graphic section of its Sunday edition. The fourth of the series, which was published in the January 15th issue, was devoted to a most interesting account of how paper is handled from the company-owned boats, through the docks to the warehouses where it is stored. When paper is needed in the press room, it is loaded on small trucks and transported by gravity through a 1,000-ft. tunnel.

The following excerpts from the article graphically describe the Tribune's fine system of handling rolls of newsprint.

"The five units of the paper warehouse department lie on an irregular plot of ground on the north bank of the Chicago River, east of the Tribune plant. The plot covered by the buildings is approximately 1,200 feet long and varies from 100 to 200 feet wide. The warehouses have a total paper capacity of 28,000 tons.

"Twenty-eight thousand tons of paper is not nearly enough to supply the Tribune's demand from the time navigation closes about the last of November to the time it reopens about the middle of April.

"When winter settles down, the warehouses are filled with paper, and there is a vessel moored at their docks with an additional 6,000 tons of paper, but despite all this, as just mentioned, rail shipping has to begin about the first of January.

"By the use of the two giant cranes, six rolls of paper may be removed from a ship in the space of a minute. The controls of the crane are not located on the crane itself, as is the usual practice, but on the upper deck of the ship. From this vantage point, the operator can see down into the hold of the ship from an angle that allows a safe perspective and also see down onto the receiving station in the warehouse. This makes for fewer accidents than if the operator was on the crane.

"Each crane is provided with safety devices that prevent the paper rolls from dropping in the event the power fails.

"So far as motor power figures in the distribution of the heavy rolls of paper throughout the warehouses after they are unloaded from the ships, very little actually is necessary. Two small two horsepower motors attend to this phase of the work. Gravity does all the rest. These motors lift small paper cars or trucks up a distance of a bare seven feet by two remarkable automatic mechanisms. Thus elevated and loaded each with a roll of paper, the little trucks roll away on tracks by the force of gravity to any place in the warehouses. There are fifty of these trucks, and virtually all are in use when a paper ship is being unloaded.

"For the purpose of transporting rolls of paper from the warehouses to the Tribune plant a tunnel approximately 1,000 feet long has been built. This tunnel descends from the warehouse in a sharp grade, penetrates and utilizes for some distance on a gradually rising grade a passage of the freight tunnel system that operates beneath the city, and then turns off into the Tribune plant.

"A roll of paper is loaded onto a truck somewhat larger than one of those previously mentioned. The truck, connected to a moving endless chain, is started on a track down the steep incline from the warehouses. When it gets part way down this incline it is released and speeds away by gravity."

Two interesting illustrations taken at the Tribune plant are shown on page 1128.

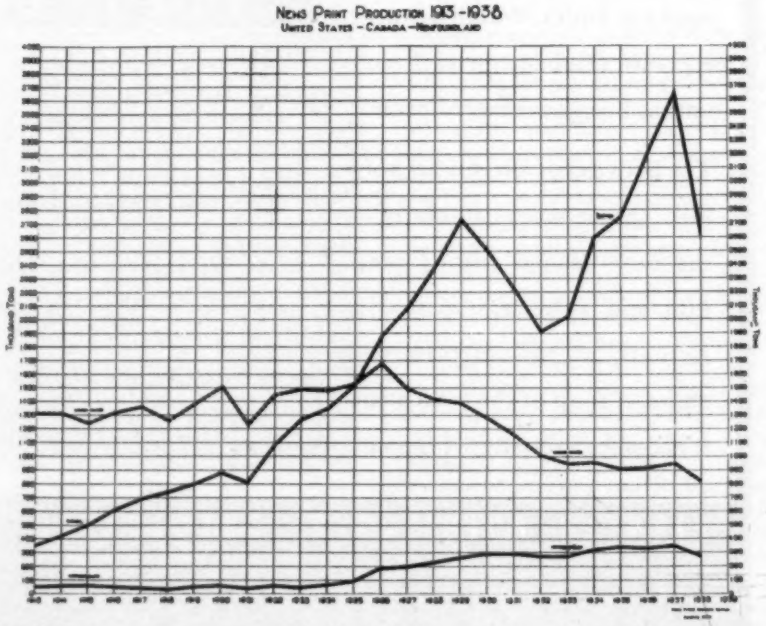
▶▶▶ PETER HEENAN, MINISTER OF LANDS AND FORESTS FOR ONTARIO, has given assurance to Fort William that to preserve the upper reaches of the famed Nipigon River for recreational purposes, serious consideration will be given by the Ontario Government to the proposal that an alternative route be designed for pulpwood driving. It was pointed out that in view of the many waterways of Ontario available for the purpose of bringing out pulpwood, the Government should not consent to the destruction of the choicest half dozen miles of all tourist waters.

◆

PROMINENT MEN WILL SPONSOR PAPER FESTIVAL

Prominent men, including leading executives of the paper industry and ten governors of Southern States have accepted places with the advisory committee for the First Annual Southern Paper Festival to be held at Savannah, Georgia, April 17-19. James G. Stahlman, publisher of the Nashville Banner and president of the American Newspaper Publishers' Association, and Robert Fechner, director of the Civilian Conservation Corps, have also joined the advisory group.

State and federal officials and seven forestry associations have pledged their co-operation in making the Festival an outstanding celebration, de-



R. S. Kellogg, secretary-treasurer of the News Print Service Bureau, has prepared this very interesting chart showing news print production in the United States, Canada and Newfoundland for the past 25 years.

THE ANSWER WOULDN'T COME!

Day after day this paper company had wrestled with a tough problem in bearing lubrication

LIKE A KID with his first algebra equation, a large paper manufacturing concern had wrestled with a lubrication problem until they were blue in the face.

For years this company had experimented, trying to find a satisfactory lubricant for the dryer rolls of their paper machines. Learning of their problem, Shell engineers offered their services.

Working with the company's maintenance men, dryer-roll bearings were taken down and all parts, including oil wells, cleaned.

New babbitt was applied and bearings carefully reassembled. Then in each bearing a different lubricant was placed—including the Shell Lubricant specified by the Shell engineers for this type of job.

At the end of a ten-day run, in which bearing speed averaged 60 R.P.M., the bearings were taken down and the oil in each one drained off into bottles while still hot.

A careful examination of the results showed the superiority of the Shell Lubricant. The bearing was in perfect condition—not a trace of carbon present. The lubricant itself was in excellent condition, and but ¾ of a pint had been consumed in 269 hours of continuous operation. The problem was solved!

Those are the facts from Case History No. 319 in Shell's files. If you are having lubricating difficulties, you will do well to paste this ad in your hat. The men who solved this company's problem can lick yours. They bring you a big "plus" in lubrication—engineering skill tested in every industry combined with the finest lubricants being refined today. Simply call or write your nearest Shell office.

SHELL *PAPER MILL* LUBRICANTS

SHELL

signed to encourage forestry conservation and to promote the use of paper and allied products.

Forestry groups which have pledged co-operation are: Slash Pine Forestry Association, Georgia Forestry Association, Florida Forestry and Park Association, Mississippi Forestry Association, North Carolina Forestry Association, Texas Forestry Association and Tennessee Forestry Association.

Some of the paper company presidents who have accepted to date are: E. L. Kurth, Lufkin, Texas, Southland Paper Mills Company; S. A. Williams, New York, Johns-Manville Products Corporation; I. J. Harvey, New York, Flintkote Company; J. C. Twinan, Chattanooga, O. B. Andrews Company; C. R. Dunham, Wilmington, Delaware, Hercules Powder Company; R. S. Crump, Richmond, Virginia, Standard Paper Manufacturing Company; Rueben R. Robertson, Canton, North Carolina, Champion Paper and Fibre Company; Col. C. W. Gaylord, Bogalusa, Louisiana, Gaylord Container Corporation; J. E. Kelley, Hodge, Louisiana, Southern Advance Bag Company; J. P. Hummel, Hopewell, Virginia, Hummel Ross Fibre Company; Alexander Calder, New York, Union Bag and Paper Corporation; C. R. Van de Carr, Chillicothe, Ohio, St. Joe Paper Company and Brunswick Pulp and Paper Company; B. Alexander, Laurel, Mississippi, Masonite Corporation; Samuel Kipnis, Jacksonville, Florida, National Container Corporation; James L. Coker, Hartsville, South Carolina, Sonoco Products Company; H. H. Strauss, New York, Champagne Paper Corporation and Ecusta Paper Company, and S. L. Wellhouse, Atlanta, Georgia, National Paper Company.

The DeSoto Hotel and Savannah Hotel are being reserved exclusively for those representing the paper industry and it is suggested reservations be made as early as possible.

◆

NEW ENGLAND PULP NEWS

WOOD pulp conditions in the New England sector attracted widespread attention recently when the Mystic Terminal Company, pier-operating subsidiary of the Boston & Maine Railroad, declared an embargo early this month on all wood pulp receipts unless they were loaded directly onto cars and shipped out of the railroad's Boston yards. The reason for the embargo was not hard to find, inasmuch as pier sheds were crammed with as much pulp as could possibly be handled, and there were 600 freight cars of loaded pulp acting as storage warehouses in the freight yards adjacent to the piers. The total pulp held by the Mystic Terminal Company was estimated at 35,000 tons, or more. Several vessels have since docked at the terminal with substantial Scandinavian pulp cargoes, one ship bringing in 17,000 bales, and another 14,000 bales.

While last year congestion was even greater than this, it was easier to explain because the market was breaking badly then and many mills were refusing to take delivery because of the very bearish outlook for pulp. Today, the pulp is being shipped on contracts about which there is no question of cancellation or refusal to take delivery ultimately. Paper manufacturers, however, report that their sheds are filled to capacity, and add that much of the pulp arrived too early. Importers state that a large portion of the stock came from Baltic ports and had to be shipped out in advance of freeze-up.

Efforts to locate additional storage at the commodious Army Base piers in South Boston led to the discovery that rates were prohibitive and indignation of some importers is such that they plan to "by-pass Boston" wherever freight rates to interior mills make it possible.

The market situation was not seriously affected by the congestion. Demand is light, krafts seeming to have been established on a cellar basis of $32 dock for prime foreign pulp and from $30 up delivered to converting mill for southern kraft. Bleached sulphite is relatively steady insofar as the top notch brands are concerned. All important domestics are quoted firmly at $50 dock equivalent. Room for doubt as to the stability of unbleached sulphite has been expressed by purchasing agents, due to the fact that good, clean, unbleached pulps have been offered them at $36-$38 for shipment from north Europe, while the domestic brands are still pegged at $40.

◆

R. KELLY SEES IMPROVEMENT IN CAN. INDUSTRY

There should be an improvement in the pulp and paper industry in Canada during the early part of this year, in the opinion of Raymond Kelly, vice-president of the Bathurst Power and Paper Company, Ltd., Bathurst, N. B.

Mr. Kelly has just completed a business trip from the Montreal head office of the Bathurst organization and also from the mills and power plants. He said that conditions in Canada reflected in a large measure the situation in the United States and that although progress in recent months has been slow it has also been steady.

PRODUCTION RATIO REPORT

(Based upon paper production reports to the American Paper and Pulp Association)

COMPARATIVE MONTHLY SUMMARIES

Months	1939	1938(c)	1937(c)	1936	1935	1934
January	—	63.9%	90.3%	76.1%	65.8%	—
February	—	68.7%	90.1%	77.9%	70.0%	—
March	—	69.6%	90.3%	76.0%	70.5%	—
April	—	68.3%	92.1%	82.3%	70.0%	—
May	—	69.0%	90.6%	81.6%	69.4%	—
June	—	66.0%	87.3%	80.7%	72.3%	—
July	—	72.0%	81.8%	77.3%	64.9%	—
August	—	77.2%	82.9%	81.5%	70.9%	—
September	—	76.3%	78.6%	80.5%	71.9%	58.2%
October	—	82.5%	73.5%	87.6%	75.6%	64.7%
November	—	79.6%	61.9%	88.0%	75.3%	61.7%
December	—	74.5%	54.3%	85.9%	71.2%	59.6%
YEAR AVERAGE	—	72.3%	80.6%	81.3%	70.5%	—
First 3 weeks	76.5%	62.5%	90.4%	75.5%	64.1%	—

(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

(Totals for the month of January have not yet been published. However, for the week of January 21, 1939, figures show 80% as against 66% for the corresponding week of 1938.)

(Total number of mills reporting for week ending January 21 is 200. The ratio of 41 of these mills was 50% and under; 159 mills rated 51% to 100%.)

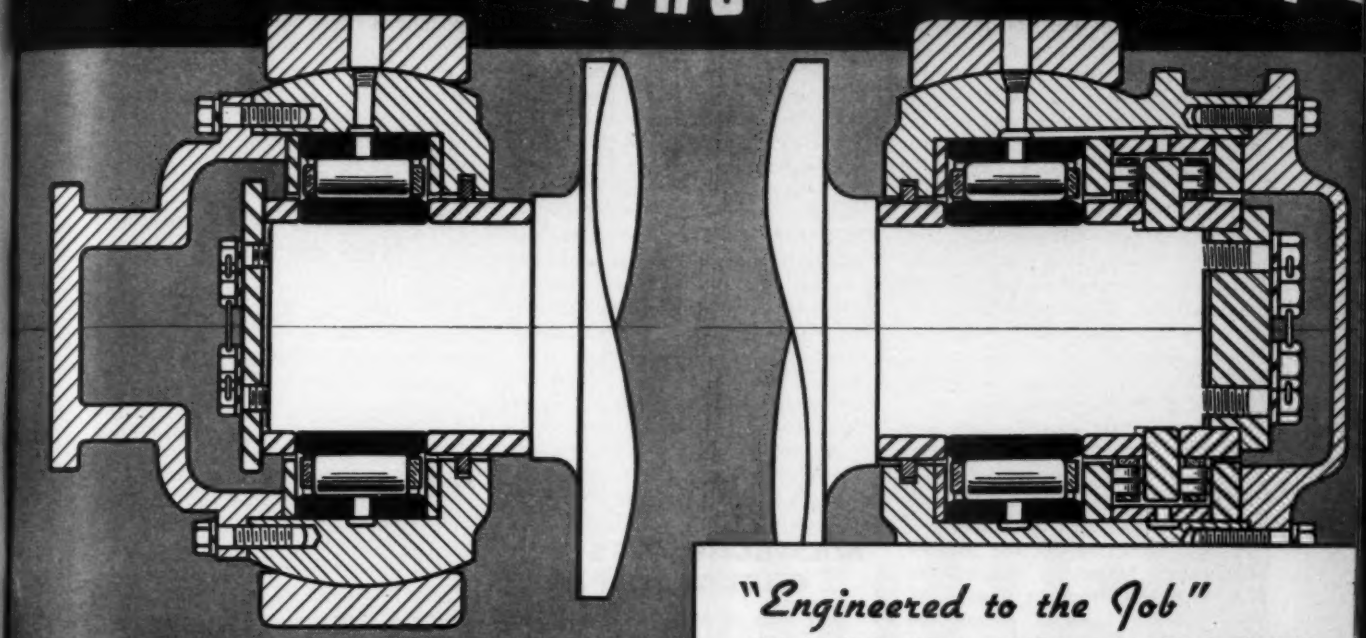
PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Months	1938(e)	1937(e)	1936	1935	Months	1938(e)	1937(e)	1936	1935
January	55%	80%	61%	61%	July	57%	67%	69%	59%
February	61%	86%	67%	67%	August	66%	74%	75%	65%
March	60%	87%	68%	67%	September	66%	70%	76%	69%
April	57%	89%	70%	61%	October	70%	66%	82%	76%
May	58%	86%	68%	61%	November	64%	56%	79%	70%
June	56%	75%	68%	65%	December	—	46%	74%	60%

(e) Basic figures revised to include new members of the National Paperboard Association. January 26, 1939.

SAVE THE FELTS, *Improve the Paper,* KEEP BEARING COSTS DOWN—



"Engineered to the Job"

Notice how the housing is grooved to take a rope or chain sling for lifting out the roll for grinding. Notice the spherical shape of the housing which permits self-alignment of the bearing. Notice the water-proof piston-ring seal against the roll, and the cap on the outer end. Notice that ample provision for lubrication and drainage is provided. The design is engineered for an installation with a calculated load of 18,600 lbs. on each bearing at a maximum paper speed of 800 f.p.m., giving a roll speed of 161 r.p.m. Each bearing has a rated radial capacity of 104,000 lbs. at this speed.

with **ROLLWAY**

Solid-Cylindrical-Roller Bearings

on your **TOP PRESS ROLLS**

YES, here's a "tough spot" that definitely calls for solid-cylindrical-roller bearings, and no other:

1—because great radial-load capacity is essential

2—because great double-acting thrust-load capacity is essential

3—because free self-alignment is essential

4—because easy installation and removal are essential

Rollway's Solid-Cylindrical-Roller Bearings give you ALL FOUR essential features in a design especially engineered for Top Press Rolls. They split the load into its two components of radial and thrust. They provide a greater area of roller metal to carry these two components. And they align themselves readily to any "crossing" of the press rolls.

Thus Rollway Roller Bearings rotate easily under load, greatly reducing the drag and wear on the felt, and eliminating drag-streaks in the sheet. This freedom from drag is further translated into longer bearing life, plus reduced maintenance cost and attention.

Types for EVERY Paper Mill Need

Rollway's free Advisory Engineering Service will gladly assist you in selecting the highest efficiency Rollway Bearing for:

- ★ Dryer Cylinders
- ★ Jordans—all makes, front, back, outboard bearings
- ★ Felt and Wire Carry Rolls
- ★ Breast Rolls
- ★ Suction Press Rolls
- ★ Cylinder Molds
- ★ Couch Molds
- ★ Primary Presses
- ★ Main Press Rolls
- ★ Pulp Grinders
- ★ Chippers
- ★ Deckers
- ★ Slitters
- ★ Reels
- ★ Loose Pulleys
- ★ Calendar Stacks—bottom, top and intermediate rolls

ROLLWAY BEARING COMPANY, INC.
SYRACUSE, N.Y.

ROLLWAY BEARINGS

31 Years Building Heavy-Duty Bearings

N. E. FREIGHT RATE CHANGES

Important freight rate adjustments were announced during January by the New England Freight Association. The adjustments apply on newsprint and wallpaper from a group of Maine mills to New York City and nearby points. The railroads gave as the reason for the reductions, the existence of the present "unregulated rates in effect via truck-water route." The tariff description provides the new rates for "newsprint of not less than 60 per cent groundwood, carload minimum weight 40,000 pounds, except for 36½-foot cars, when it shall be 36,000 pounds carload minimum." To obtain these rates, the wallpaper must be blank and not further processed beyond the rough stage. The same minimum rates apply as on newsprint. "Oatmeal" or "ingrained" wallpaper do not come under this classification.

Typical reductions cut the rate for Millinocket, Maine, as follows: to New York and Brooklyn, from 32 to 30½ cents a hundred pounds; to Milton, from 33 to 30½ cents; to Bridgeport, Connecticut, from 30 to 29½ cents and to Peekskill, New York, from 32 to 30½ cents. Proportionate cuts were also made in the rates from other mills. For example, the rate from Livermore Falls to New York was cut from 28 cents to 26½ cents; from Bucksport, 31 to 29½ cents; from Woodland, 32 to 30½ cents; from Madawaska 37 to 35½ cents, and from Brunswick, 26 to 24½ cents.

The traffic executives of the railroads in official classification territory have referred to a subcommittee the objections of pulp and paper manufacture to the proposed rate advances on wood pulp. This committee is expected to report during this month. The railroad proposals envisage the application of "Column 25" rates, in effect 25 per cent of first class on wood pulp within official territory (north of the Ohio and Potomac Rivers and, generally speaking, east of the Mississippi River.) This would mean advances of varying degree and would apply also on rates from Canada which would be adjusted similarly to proposed changes on pulp from New England. Exceptions to the proposed changes as originally issued would be import and intercoastal rates to Central Freight Association destinations, obviously, it is reported, a move to protect against St. Lawrence-Great Lakes steamship rates.

◆

MASSACHUSETTS ORDERS ITS PAPER

The State of Massachusetts recently purchased various portions of their 1939 paper supply from the following companies: 90,000 pounds machine finish book from Tileston & Hollingsworth Company, Boston; 170,000 pounds of 25 per cent rag-content bond from Rutter & McNaught, Inc., bidding on Collins Mfg. Company's "general" bond; 100,000 pounds of No. 4 sulphite bond from Tileston & Hollingsworth Company; 5,000 pounds of 100 per cent rag ledger from Rutter & McNaught, Inc., Boston, bidding on Collins Mfg. Company's linen ledger; 40,000 pounds No. 1 sulphite ledger from Whiting Paper Company, Holyoke; 10,000 pounds of cover paper, antique finish, from John Carter & Company, bidding on Chemical Paper Mfg. Company's International Cover, and 10,000 pounds No. 3 index bristol from P. D. Wells, Boston, bidding on American Writing Paper Corporation's "Daring."

◆

SOUTHERN ADVANCE HAS NEW YANKEE

The Southern Advance Bag and Paper Company, Boston, recently announced that the 120-inch Yankee machine built by Pusey and Jones Corporation is now in operation at the company's plant. The new machine's production runs from 25 to 35 tons daily, its product being high-finish and light-weight kraft papers.

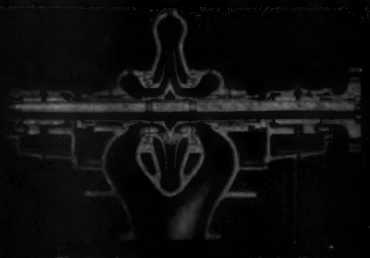
The Yankee has a nominal trim of 112 inches with a wire 65 feet long and 120 inches wide. Among the other specifications noted on this machine is a shake of the latest design suited for the proper formation of tissue and medium-weight papers. There are 20 dryers and two felt dryers tested to 40 pounds per square inch for steam pressure. There is also a special air valve on the tending end of each machine. The dryers are equipped with improved, pressure-sealing, oil-less type steam joints with graphite composition steam-tight packing arranged to admit steam to dryers and to remove water of condensation by means of a symphon pipe.

The Yankee dryer is 144 inches

At a formal opening of its new power plant, the officials of Northern Paper Mills, Green Bay, Wisconsin, entertained some 80 important industrial heads and Wisconsin paper mill officials at a luncheon in the boiler room. Left (left to right)—W. E. Schubert, general manager of the Wisconsin-Michigan Power Company, Appleton; J. P. Pulliam, president of Wisconsin Public Service Corporation, Milwaukee; F. C. Chambers, vice-president and general manager of the Iowa Electric Light and Power Company, Cedar Rapids, and Earle Murray, president of Northern Paper Mills, in front of one of the electric generator meter panels. Right—Voyta Wrabetz, chairman of the Wisconsin Industrial Commission, peers through a cobalt glass screen into one of the furnaces. George Meyer, second fireman, looks on.

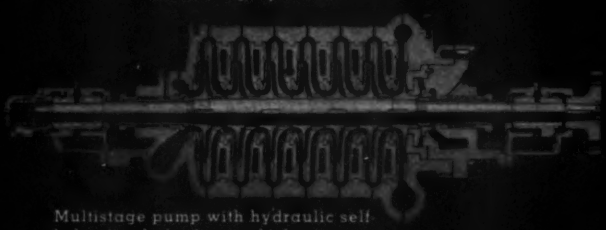
Single stage, double suction pump with ball bearings.

Sleeve bearing pump, with casing cover and bearing caps lifted.



Sleeve bearing pump with ball thrust bearing.

Motor-mounted pump.

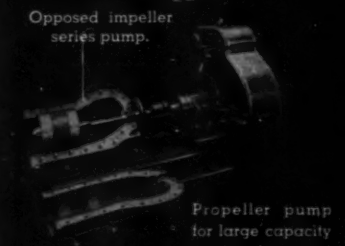


Multistage pump with hydraulic self-balancing device for very high pressures.

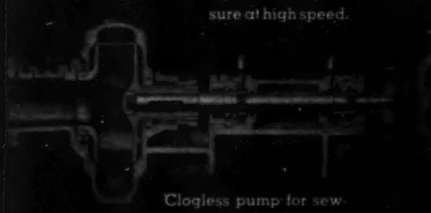
Labyrinth wearing rings for reducing leakage from discharge to suction of centrifugal pump.

Single stage, single suction pump.

Opposed impeller series pump.



Propeller pump for large capacity against low pressure at high speed.



Clogless pump for sewage, wood pulp, etc.

PUMPS FOR ALL PURPOSES

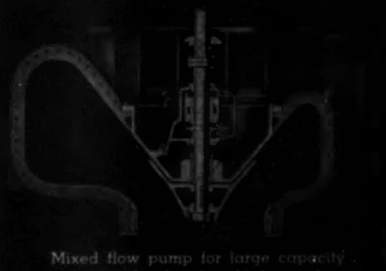
De Laval Centrifugal Pumps are characterized by high efficiency and exceptional reliability, obtained by scientific design based on exhaustive development and tests, by the use of the most suitable materials, and by precision manufacture on a limit gage, interchangeable basis.

The casing is split in the horizontal plane of the shaft and internal parts are accessible and removable upon lifting casing cover and bearing caps. At all points subject to wear the main pump parts are protected by renewable wearing parts, the most important of which are the labyrinth rings which reduce leakage from discharge to suction, while permitting ample mechanical clearances.

Each pump is guaranteed as to mechanical perfection and operating characteristics and is tested before shipment from the De Laval Works.

State your pumping requirements fully and appropriate literature, with suggestions concerning the most suitable type and arrangement of pumping equipment, will be sent.

De Laval IMO rotary displacement pump for oil.



Mixed flow pump for large capacity against low heads at high speed.

DE LAVAL STEAM TURBINE CO., TRENTON, N. J.

by 120 inches tested to 50 pounds steam pressure and to 75 pounds hydrostatic. The calender stack of five rolls has housing suitable for the addition of two future rolls. There is one Cameron machine (No. 18) which is 112 inches wide and with a 42-inch maximum diameter in addition to ten slitter units. The D. J. Murray collapsible windshafts provide a 2,000-feet per minute speed.

◆

SCOTT PAPER IMPROVEMENTS NOW COMPLETE

Construction work on the Scott Paper Company's new additions and improvements to the mill at Chester, Pennsylvania, have been completed and the new paper machine, built and installed by the Beloit Iron Works, Beloit, Wisconsin, has already started operation.

The company has erected a building to house the new machine, and has also erected an additional structure to house finishing operations. In addition, the company has built a wharf, made additions and improvements to the water intake and filtration system, installed a steam turbo-generator and pressure boiler, and has enlarged and rebuilt the No. 11 papermaking machine. Improvements have also been made to the steam generating and electrical power plant.

The Scott Paper Company, in order to finance these many improvements, recently made public offering of 30,000 shares of cumulative preferred stock, no-par value (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 601, Sept. 1938).

◆

H. & W. TO START CONSTRUCTION OF SOUTHERN PLANT

That the Hollingsworth and Whitnew Company will begin construction of a pulp and paper mill at Mobile, Alabama, seems definitely assured at present. President M. L. Madden of H. & W., addressing stockholders at the annual meeting in Boston, stated that studies in connection with the firm's Southern development had now sufficiently progressed, and that it was planned to start construction early this year. The plant would be completed within a 12-month period.

First announcement of Hollingsworth and Whitney's intended project came in November, 1937, (cf. *Paper World*, p. 19, Nov. 1937), when it was made known that the Massachusetts organization had purchased a tract of land on the Mobile River for the eventual erection of a complete pulp and paper mill based on the sulphate process.

New addition to the plant of the Scott Paper Co., Chester, Pa., where the new paper machine and auxiliary equipment have been installed. The machine already has made its initial run. The main building is just to the right of the new addition and is connected with it by runways which do not show in the illustration.

Later, in April 1938, (cf. *Paper World*, p. 19, April 1938) it was reported that the company's land purchases in Alabama had involved some $401,000, and that the firm had made additional purchases in the acquisition of a complete mill site and timberland.

As recent as February 1, however, there had been no announcement as to whether contracts for machinery had yet been closed.

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▶▶▶ MARKET POSSIBILITIES FOR AMERICAN WOODPULP in France are more or less confined to the grade of pulp most suitable for the production of rayon as French pulp is primarily used for papermaking. Competent dealers have expressed the opinion that there is a favorable prospect for the sale of American wood pulp on a strictly quality basis.

◆

HOLD WAGE AND HOUR HEARINGS IN WASHINGTON

Two important wage and hour hearings involving the paper industry took place in Washington the week of Jan. 16.

The pulpwood producers, with representatives from different parts of the country, presented a plea for exemption periods for pulpwood cutters and particularly that it be recognized that the pulpwood cutting season varies in different parts of the country. They also asked that it be recognized that the seasonal employment of wood cutters, haulers and peelers are not in the same period in any one locality. The presentation was under that provision of the law which provides for an allowance of not over 12 hours per day or 56 hours per week during a specified period of fourteen weeks. Decision on this petition was deferred.

The general appearance of representatives of the paper mills was held before Metcalf Walling, one of Commissioner Andrews' principal assistants. The committee from the industry included Stuart Kay and George Adams, International Paper Company; A. S. Anderson, Champion Paper & Fibre Company; H. A. Legge, Aetna Paper Company; D. G. Hollister, A. P. W. Paper Company; Arthur Hobson, St. Croix Paper Company; James W. Townsen, West Virginia Pulp & Paper Company; E. F. Bearce, Chillicothe Paper Company; G. A. Grondona, National Paper Products Company; together with officials of the American Paper & Pulp Association and representatives of the paper mill labor unions. The hearing was an informal discussion of an equitable wage rate for the industry, preliminary to a formal public hearing scheduled for March 28.

The report of the Public Printer, Col. A. E. Geigenack, shows that for the year ending June 30, 1938, the Government Printing Office paid over $5,000,000 for over 40,000 tons of paper and paperboard.

What's Butch McGee doing in a perfume ad?

NOBODY loves the paper manufacturer when "show-through" shadow makes pictures and type matter pop up in unexpected places.

But there really isn't any excuse for show-through anymore. For now it's easy and economical to make even the thinnest paper opaque with Krebs Pigments.

These pigments make any paper whiter and brighter, too . . . so that every sheet makes sharp, easy-to-read printing possible on both sides.

But find out for yourself. Write for full information about Krebs Pigments . . . how easy they are to use . . . and how they improve the appearance of your paper.

Krebs Pigments and Color Corporation, 1007 Orange Street, Wilmington, Delaware.

KREBS white and colored pigments

FINANCIAL

New York Stock Exchange—Stocks	Closing Prices Jan. 31, 1939	Dec. 31, 1938
A. P. W. Paper	*2¼–3	2⅜
Celotex	17	18⅞
Same Preferred	68	67
Certain-teed Prod.	10⅞	11⅞
Same Preferred	41⅜	42
Champion P. & F. Co.	26¼	30
Same Preferred	*97–100	105
Container Corp.	13⅞	16¼
Cont. Diamond	8¾	9¼
Crown Zellerbach	13¼	14⅜
Same Preferred	*87½–89⅜	87
Dixie Vortex	*10½–11	11¾
Same "A"	27⅝	34⅜
Flintcote	27⅝	31⅛
Robert Gair	3¼	4
Same Preferred	11	12¾
Gaylord Container	*16½–17	19
Same Preferred	48¼	51⅞
International P. & P.	12⅜	14½
Same Preferred	45	50¾
Kimberly Clark	25	27½
MacAndrews & Forbes	*29½–30¾	32
Masonite	49¼	57
Mead Corp.	10¾	11½
Same Preferred	*67–69	69
Paraffine Co.	*54½–56½	59
Same Preferred	*101¼	102
Rayonnier	14	17¼
Same Preferred	20¼	23½
Scott Paper	*46–46¾	48½
Same Preferred	*114–114¾	113¼
Union Bag & P.	10	12
U. S. Gypsum	101	112
Same Preferred	*175	175
New York Stock Exchange—Bonds		
Celotex 4½%	90	89½
Certain-teed 5½%	——	79⅞
Champion P. & F. Co. 4¾%	——	99¾
Same (38)	104¼	100
Container Corp. 5%	——	104
Same 6%	103½	99¾
Inter. P. & P. Co. 6%	92½	92¾
Same 5%	98	99⅜
Mead Corp.	103½	103⅛
New York Curb Exchange—Stocks		
Am. Boxboard	*7½–9	7¾
Brown Co. Preferred	16–18½	18½
Det. Pap. Prod.	*1¾–2¾	1¾
Gt. Northern	37	38½
Hummel Ross	3⅞	3¾
Nat. Container	*5½–7	6½
St. Regis	2⅞	3⅛
Taggart	4¾	4¾
United Wall Paper	2⅜	2⅝

*Bid and Asked closing.

◇

MAY RESUME ACTIVITY AT PORT ROYAL

The Port Royal Pulp and Paper Company, whose pulp mill is located at Fairville, N. B., has been reported unofficially as preparing to resume production on specific dates.

The mill had been running at capacity after installation of equipment for the manufacture of rayon pulp for shipment to Japan but this market collapsed after the Japanese failed to finance such imports.

BRIEFS

▶▶▶ SCOTT PAPER COMPANY, Chester, Pennsylvania, has elected to redeem $250,000 principal amount of its 3¼ per cent convertible debenture bonds at 105 on March 1, 1939. The Company reports that as of the close of business January 10, there was outstanding only $2,756,000 of the original $4,000,000 principal amount of these bonds issued March 1, 1937.

◆

▶▶▶ THE RONDOUT PAPER MILLS and Walker, Goulard & Plehn are among the creditors of Waxed Products Company, Newark, N. J., which was thrown into bankruptcy in January.

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▶▶▶ FOR THE FIRST TIME since early last April, the Atholville (N.B.) sulphite mill of Fraser Companies, Ltd., Edmundston, N. B., went on full time. The plant had been completely shut down for about three weeks before resuming full time. The Atholville mill is the newest of the Fraser pulp and paper plants.

◆

▶▶▶ THE EASTERN MANUFACTURING COMPANY'S reorganization case was granted a continuance to February 15 by Judge Peters in the Federal District Court at Bangor, Maine. This is to permit time in securing the deposit of a requisite number of securities, stock and creditor's claims.

◆

▶▶▶ AN AMENDMENT TO THE Bowater-Newfoundland agreement increases the penalty for non-fulfillment of that part of the contract calling for a minimum cut for export of 50,000 cords annually from 25 cents to $2 a cord.

◆

▶▶▶ THE GREAT NORTHERN PAPER COMPANY'S new hydro-electric power development at Mattaceunk, Maine, is being rapidly pushed towards completion. The dam and poweh house were started December, 1937, and at present the power house is complete, the gate piers are ready for the toller gate, the log sluice is finished and the bridge to the west side of the river is under construction.

▶▶▶ FIVE HUNDRED ALL-STEEL BOX CARS, embodying some exclusive new features in railway equipment, are now used by the Bangor and Aroostook Railroad to carry Maine newsprint to market. One feature which is worth mentioning is the attractive appearance of the cars which, together with the many new utilitarian improvements, have attracted wide attention for the transportation and newsprint industries. The cars have special features which provide against shocks.

◆

▶▶▶ EMPLOYEES OF THE UNION BAG AND PAPER CORPORATION have subscribed to 30,203 shares, or approximately 15 per cent of the 210,455 new shares of capital stock of the company now being offered to stockholders. Subscription rights for stockholders to purchase additional stock at $9.50 per share expired February 3.

◆

▶▶▶ CANADA PAPER COMPANY, a subsidiary of Howard Smith Paper Mills, has completed an agreement with the town of Sherbrooke, Quebec, whereby Sherbrooke acquires the Ulverton power site on the St. Francis River. The company will contract for 3,000 horsepower with a secondary supply of 15,000 hp.

◆

▶▶▶ THE NEW BRUNSWICK GOVERNMENT has been presented with a petition by the unemployed of Lancaster to investigate the possibility of re-opening the Port Royal Pulp and Paper Mill at St. John, N. B.

◆

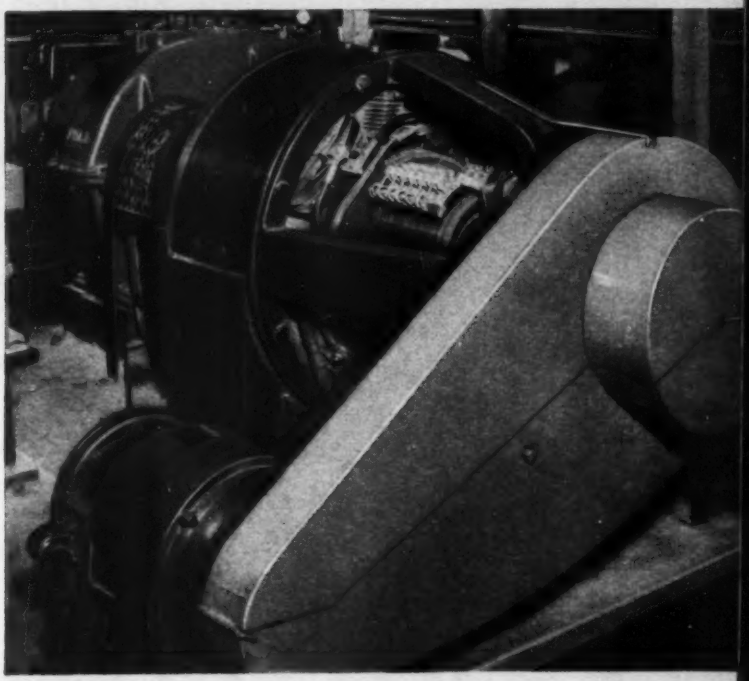
▶▶▶ AS FAR AS CAN BE LEARNED, there have been no important developments recently in the affairs of the Lake Sulphite Company, now in receivership. Conservation of the assets seems to be the main task of the receivers. It is understood that several engineers have looked over the property on behalf of responsible interests, but nothing in the way of an offer to purchase has been reported.

◆

▶▶▶ NEGOTIATING FOR THE PURCHASE of Price Brothers' timber holdings in Bellechasse, Montmagny and L'Islet counties (Canada) is the Canada Paper Company, a subsidiary of Howard Smith Paper Company. The amount involved in the purchase is said to be around $200,000.

TO PAPER-MILL MEN SEEKING RELIABLE, EFFICIENT DRIVES

You Get CONSTANT *Threading and Running Speeds* with G-E High-speed Supercalender Drive

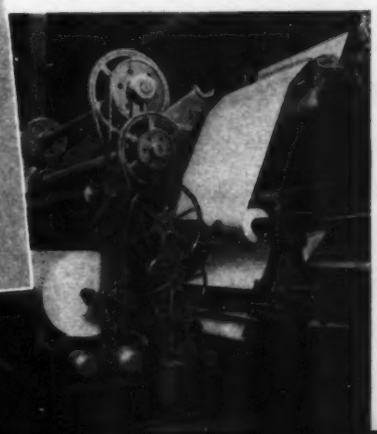


G-E double-motor drive—the small a-c motor for threading and the large d-c motor for running—operating high-speed supercalender

MODERN ELECTRIFICATION

Following are 10 of the modern applications of electricity to paper mills devised especially by General Electric to improve productive efficiency.

1. Automatic tension control
2. Turbines with 3-arm governing mechanism
3. Progressive draw adjustment
4. Turbines with wide-range electric governors
5. Regenerative tension winder drives
6. Sectional paper-machine drives
7. Selsyn draw adjustment from front of paper machine
8. High-speed voltage regulators
9. Photoelectric register control
10. Direct-connected chipper motors



High-speed supercalender, 2000-fpm, driven and controlled by G-E double-motor system

By a system employing both an individual threading motor and an adjustable voltage d-c main motor, the typical General Electric supercalender drive provides the advantages of constant speed, regardless of load variation, both in threading and in running.

NO OVERSHOOTING

An economically small motor provides smooth and constant threading speed. There is no jerking or overshooting, such as sometimes occurs with ordinary drives. The G-E system assures a threading speed that facilitates quick threading because the driving speed is maintained within so small a variation as to be substantially constant. Spoilage and waste—especially costly at the supercalender—are thus diminished.

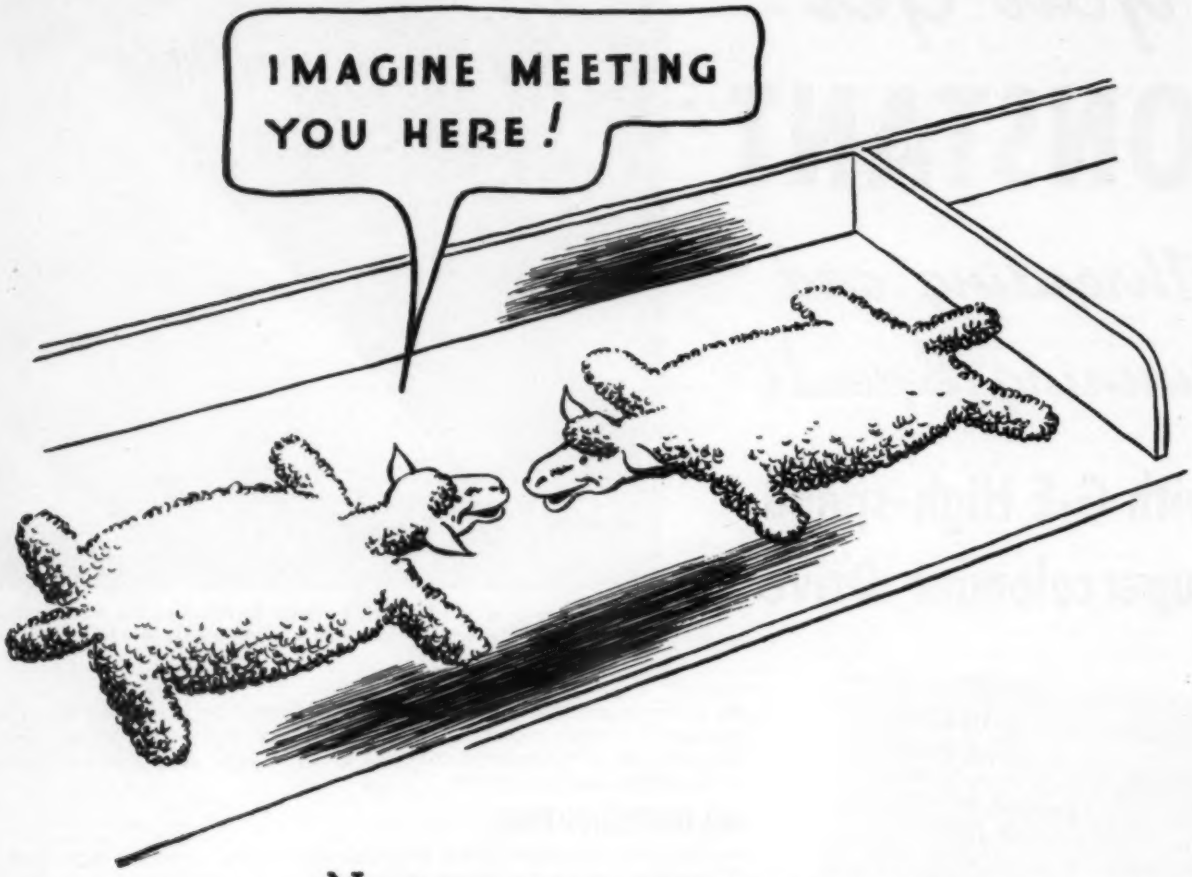
FAST ACCELERATION

When the operator is ready to send the supercalender up to running speed, he gets quick acceleration from the G-E main drive. In a typical application, a 2000-fpm supercalender attains top speed in 40 seconds from threading speed. By use of regenerative braking on the d-c main motor, quick stops can be made in 30 seconds.

This type of supercalender drive, while providing ample adjustment for different operating speeds, is easy to operate and simple to maintain. For particulars on any type of drive for the pulp and paper industry, consult the nearest G-E office, or write General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

Said the fleece from ENGLAND
to the fleece from AUSTRALIA:



Nothing strange about it! For the Huyck Wool Room is the daily scene of an international wool-gathering!

Fleeces come from Australia, New Zealand, and South Africa, from England and Ireland, from the Argentine, Canada, and the United States. Chosen in the wool markets of the world to meet Kenwood's exacting standards, they are shipped thousands of miles across the seas to the great wool storehouses of F. C. Huyck & Sons. Here, just the right wools are selected and blended to make felts exactly suited to your needs.

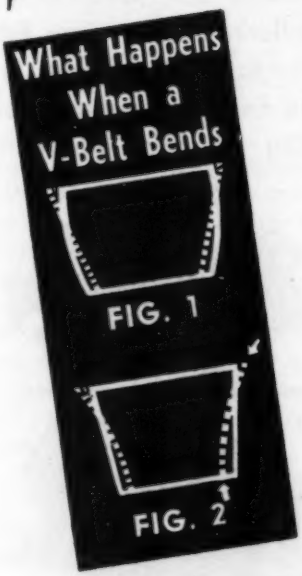
KENWOOD WOOL PRODUCTS

F. C. HUYCK & SONS

KENWOOD FELTS · ALBANY, N. Y.

THE
Concave Side
IS A GATES PATENT
Two 100-h.p. Gates Vulco Rope V-Flat Drives on 2700-lb. Beaters. Previously, Flat Belts had Slipped at the Motor Pulley and Burned Off When Beater Rolls Stuck. The V-Belts Run in a Grooved Sheave on Motor. Sticking of Beater Rolls now Stops the Motor —Kicks Out Overload Device.

Make This Simple Test and *Cut* YOUR transmission Costs!



PICK up *any* V-belt having the ordinary straight side and *bend* the belt. Three things will happen, right before your eyes.

(1) The top of the belt is under tension and grows *narrower*. (2) The bottom is under compression and becomes *wider*. (3) The sides of the belt *bulge out*. (Figure 1, at left.)

This bulging of the straight sided V-belt in its sheave-groove costs you money in *two* ways—(1) The bulge causes uneven sidewall wear—*shorter life!* (2) The bulging side cannot evenly grip the sheavewall—a *loss in transmission* efficiency!

In figure 2, you see how the precisely engineered *concave* side of the Gates Vulco Rope exactly corrects this bulging. Two distinct *savings* result. (1) The Gates Vulco Rope wears evenly—*longer life!* (2) The entire side-wall grips the pulley —carries heavier loads without slippage: saves the belts and also saves your *power!*

The Gates Vulco Rope is the *only* V-belt built with the patented concave side.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

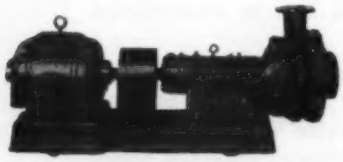
CHICAGO, ILL., 1524 South Western Ave. HOBOKEN, N. J., Terminal Building BIRMINGHAM, ALA., 1631 1st Ave., S. LOS ANGELES, CAL., 741 Warehouse St.
DENVER, COLO., 999 South Broadway DALLAS, TEX., 2213 Griffin Street PORTLAND, ORE., 1231 N. W. Hoyt St. SAN FRANCISCO, CAL., 2760 16th St.

FOR THE PAPER INDUSTRY ...NEW ECONOMIES

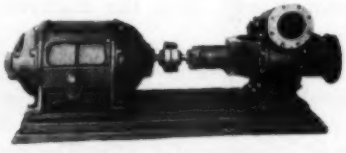
Backed by 90 years of successful experience in pump manufacturing, Goulds can fill every pumping need of the paper mill with paper stock, agitator, and fire pumps, single and double suction, single or multi-stage centrifugal pumps, triplex ball valve pumps and other miscellaneous types.

Advance design, carefully selected materials, and the production facilities of the world's largest manufacturer of pumps are embodied in every Goulds Unit. This combination assures you of new economy and greater dependability when you specify Goulds.

Write today for Bulletin 206. It gives full data on Goulds Pumps for the paper industry—a complete line that covers your every liquid-handling job with maximum efficiency.

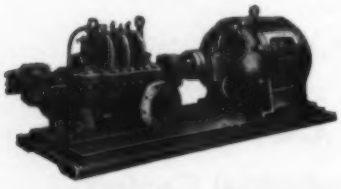


Goulds Fig. 3835 Chemical Pump.

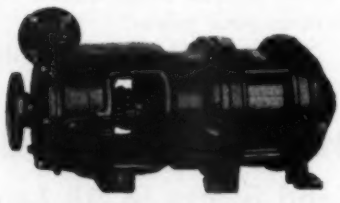


Goulds Agitator Pumps.

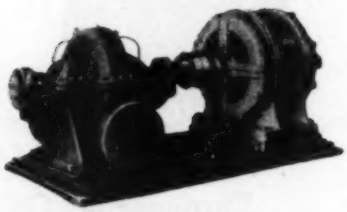
Goulds Fig. 3185 Centrifugal Paper Stock Pump.



Goulds Multi-Stage Centrifugal Pumps.



Goulds "Close-Cupld" Centrifugal Pumps.



Goulds Double Suction Centrifugal Pumps.

GOULDS PUMPS Inc.

ATLANTA, BOSTON, CHICAGO, HOUSTON, NEW YORK, PHILADELPHIA, PITTSBURGH, TULSA. Representatives in all Principal Cities

8882

Editorial ★ ★ ★

SANITY VS. RECKLESSNESS

▸▸▸ AS WE REVIEW THE EVENTS of the initial month of the year, our message for the month must be optimistic.

While it is true that general business suffered a rather chilling check from the reckless spending recommendations emanating from the White House, yet the check is but temporary, for the country by and large has great faith in in the bravery and sanity of this present Congress. They believe that this Congress will prove to be an effectual check upon the recklessness of the administration.

The slight hesitation of business during the last two weeks will disappear as soon as the business interests of the country are convinced that Congress will act in accordance with the mandate given it in the November elections. Already, Congress has furnished the country with such evidence by refusing to grant the request for $875,000,000 for relief. To the dismay of the Administration, they lopped off a cool $150,000,000, and in spite of every plea and every pressure applied, both the Senate and the House ratified the reduction. Had the vote in the Senate been taken a few days later, the majority would have been greater for the saving.

This first battle between the forces of "sanity vs. recklessness" was an epochal one. It marks the turning of the tide. It warrants the conviction that in all of the following battles, which are to come between these two forces, sanity will triumph. It is the first concrete piece of evidence that Congress is determined to be the check, which the people expect, to any further Administration recklessness. The consequent influence upon general business is highly important and is already discernible, for business likewise is determined to go ahead and expand. It knows now that it cannot look for sane co-operation from the White House, but it can have it from Congress. Hence, the sturdy upturn of business which greeted the New Year and which was temporarily dampened by the Administration's extravagant demands for added billions for reckless spending, has now had its major chill appeased and it can go forward with confidence. And it will.

Every factor for better business in 1939 is present in the equation. The exceptions are war scares and saber rattling. However, in such an enlightened and progressive country as our democracy, it is well understood that saber rattling and war scares are the expedients which dictators and hard pressed politicians provide as diversions for the electorate. It's an over-worked bogey.

It galls and scalds our intelligence, as it must the other hundreds of millions of our countrymen, to note the gullibility of our business leaders to fall for such manifest subterfuges.

It was only a short week ago that the whole world ceased to do business and held its breath for a whole day awaiting the ukase of Mr. Hitler in Germany. He was to pronounce the economic destiny of the world. He didn't. Signor Mussolini was scheduled to follow with a yowl calculated to send business into a tail spin. He did not emit a squawk.

Yet, international business was suspended, equities and commodity prices and values were depressed by hundreds of millions throughout the world in anticipation.

The time has come to end such insane situations.

The courageous Congress, which the people of the United States have sent to Washington this year, has in its power the rationalization of the senseless, silly symphonies sung by the pseudo virtuosos in this country as well as the other bogey men in other places in the world.

We believe Congress will do it. A very sick world's recovery is certain if they do.

The issue is *Sanity vs. Recklessness.*

HAZARDS

▸▸▸ NOT SO MANY YEARS AGO, a pulp or paper mill was considered a rather hazardous place in which to work. Accidents were common and in many instances were taken as a matter of course. Evidence of this latter fact is revealed in the following lines taken from a poem entitled, "The Song of the Sulphite Mill," a poem written by George W. E. Daniels and which found its way some years ago into the literature of the industry:

"Just carry him out—fresh air is the best,
Unfasten his clothing—let time do the rest;
Call it accident forty-one."

Thanks to efforts along safety lines during the past twenty-five years, this picture has been changed considerably. Accident frequency has been reduced materially in many mills. A few of the mills have developed marvelous safety records. Other records are in the making. The future is even brighter than the immediate past.

A number of things have contributed to this progress. Among them has been the development of improved materials of construction for equipment and auxiliaries; improved design of numerous items of equipment, better machine guarding, improved plant layouts; better artificial illumination; and the development of a safety consciousness on the part of the working force through some form of instruction.

Constant vigilance, however, must be the watchword. Chances cannot be taken.

The safe way to do a thing is the right way. This fact must always be kept before the working force.

There can be no letup in safety effort; but rather there should be even a greater concentration of this effort. It is only in this way that such physical hazards as are presented by the industry can be met and their effect minimized.

CURRENT THOUGHT

THE MORE WE HAVE . . . THE MORE WE WANT

WILLIAM SIBLEY

EACH morning, on the way to work, I walk past a W P A project which employs perhaps a couple of hundred men. There are two ways I can tell it is a federal relief project: first—it is so marked; second—by the large number of cars parked nearby, waiting to take the men (on relief) back to their homes after the day's work. A few mornings ago I snitched an hour or so from work and mingled with this group of W P A workers, asking them questions. Only a small fraction of the men talked (or wanted to talk) about the political or economic situation. The reason for this, I believe, lies in the fact that deep underneath the majority of us know that we cannot talk economics with any degree of intelligence. We just don't know what "politics" or "economics" mean, in the broader sense, and so turn to subjects easier to comprehend. And in this group of men, on relief, quite a little of the talk was about Charlie McCarthy, Fibber McGee, and Ferdinand, the Bull. Indicating thereby that they had radio receiving sets in their homes, and the money to occasionally attend the movies. Practically the only "solid" conversation I got out of my research was a blind adherence to the need for old-age pensions, and the leering assurance that the late Mr. Coster of McKesson & Robbins was "typical" of all big business men.

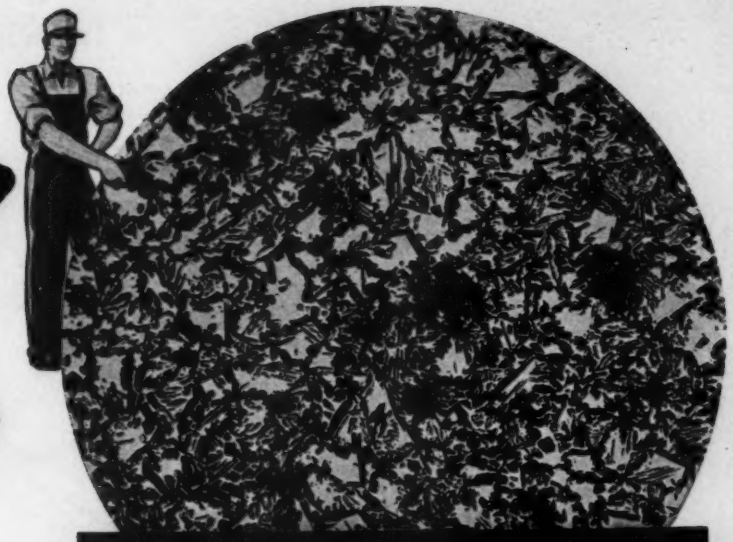
▶▶▶ Whether or not it is a good or bad thing for people dependent upon taxation to be owners and users of radios, movies and automobiles—I leave to you. But mingling with those men I couldn't help but realize that the majority were approximately of my age, or older, and so individually must remember many times which were actually harder to take than those of the present. We used to consider ourselves "rich" if we had straw-matting on the bedroom floor. Our household lighting wasn't the pineknots in the fireplace of Lincoln but it was a very smelly kerosene lamp which afforded only a yellow light decidedly harmful to juvenile eyesight. We didn't have to use persimmon seeds for buttons but I (and doubtless many of the W P A-ers) have used shingle nails or thorns. When most of us were children the family "alarm-clock" was father shaking down the base-burner—and we were among the few families in town who owned such a glorious piece of furniture. For several years my father raised his family on an average of $45 a month, and later I shocked barley under a blazing sun for $2.50 a week. Many of those men on that W P A project must have had similar background.

▶▶▶ And so it gets me down when I hear incessant croaking about "hard times." Nor am I a Pollyanna. I know things aren't right with us in this year of grace, and that many corrective things should be done immediately. But it does seem to me that the more we have, the more we want to sit down. Our trouble, for the most part, is within our heads, not outside our bodies. We have more and better homes; better streets and roads; more and better schools, libraries, entertainment, diversion, education, and hospitals, yes, far more luxury than ever before in all history. Right now we are trying to build a generation through their stomachs rather than through their brains, and unfortunately that suits a large percentage of our population right down to the ground. *Get this:* we cannot buy our way out of this or any other depression. We have to work it out. If we lack capacity, we can't go to a free textbook school, supported by taxation, and have it injected with a hypodermic needle. Capacity for progress is something to be earned, not learned.

What a man is, is far more important than what he has. I have only crocodile tears for many of the stockholders who lost their portion of the $18,000,000 worth of vanished assets in the McKesson & Robbins fiasco. I have owned stocks in various companies, and I have known many others who own stocks in these and yet other companies. And time after time the indifference of my friends in the welfare of their financial property extended to the point where they neglected to sign and return their officer-election proxies. On the New York Stock Exchange alone, and among the stockholders of 353 companies (McKesson & Robbins among them) more than one-third of all the stockholders deliberately disfranchised themselves by evidencing too little interest to lick an envelope.

▶▶▶ Yes, the more we have, the more we want—to sit down. Yet surrounded by cheap movies, play-grounds, gasoline filling stations, free schools, ultra-modern hospitals equipped with generous "out-patient" departments, well-built modern homes, so many of us, *too* many of us, read the amazing story of Mr. Coster and veer farther and farther to the left of just that which has made our surroundings possible. It isn't "capitalism" which makes frenzied finance possible. It isn't "socialism" which creates the demands for old-age pensions and "relief." It is our desire to sit down, amid plenty.

Ewart Detachable Link-Belt
"400" Class Pintle Chain
"H" Class Saw Mill Pintle Chain
"C" Class "Combination" Chain
"700" Class Chain
"800" Class Ley Bushed Chain
"1100" Class Roller Chain

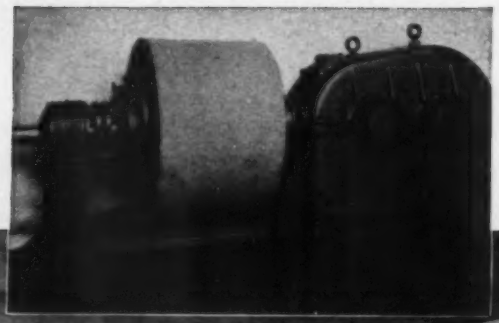


The ADDED VALUES *in* LINK-BELT PROMAL CHAIN *are Explained Right Here*

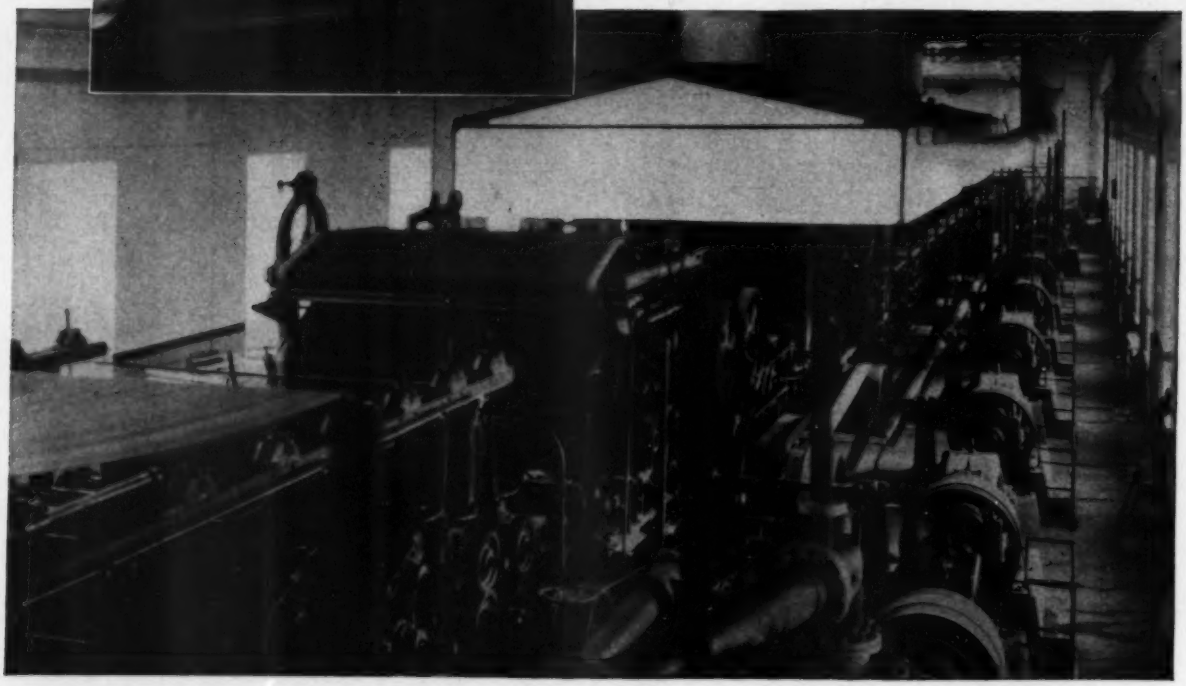
● Take a look at this close-up of success! It's a micro-photograph of PROMAL, the Link-Belt stronger, longer-wearing chain metal.

See how PROMAL quality runs all the way through—BLACK is strong, stiff metal, reinforcing WHITE softer mass which absorbs stress. PROMAL is not merely skin-hardened—it stands up under tension, fatigue and abrasion, from surface to its very core.

Its longer, trouble-free service is cutting costs in many industries. Send for catalog. Address: Link-Belt Company, Indianapolis, Chicago, Philadelphia, San Francisco, Toronto, Atlanta, or any of our other offices, located in principal cities.



THE PUSEY & JONES CORPORATION are builders of the paper machine drive units shown in close up opposite, and as applied in large box board mill below. Hyatt Roller Bearings in these units are typical of their widespread use in the paper industry.

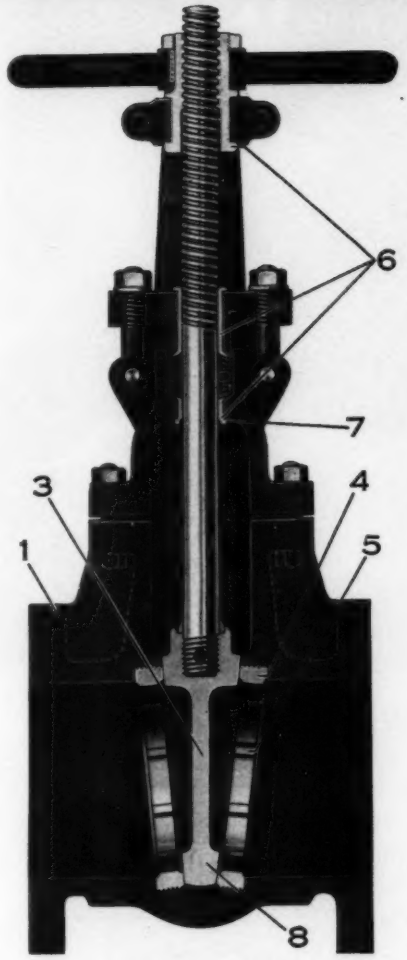


For Dependable Bearings Depend on Hyatt

Long, smooth, dependable performance is Hyatt's contribution to the efficient and economical production of pulp and paper, for a good many years. You'll find Hyatt Roller Bearings doing their work of conservation everywhere... running easily, accurately, and economically ...guarding against waste, wear, maintenance, replacements, and shutdowns. We will gladly furnish any application data you may desire, on these dependable bearings, for your equipment. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.

HYATT *Roller Bearings*

When You Specify Iron Body Gate Valves Use this Check List



Iron Body Bronze Mounted

Standard { 125 lb. S.P. / 175 lb. W.O.G.

Heavy { 175 lb. S.P. / 350 lb. W.O.G.

Extra Heavy { 250 lb. S.P. / 500 lb. W.O.G.

Also regularly available in All-Iron patterns with renewable seat rings, for handling solutions which attack bronze but not iron.

	LUNKENHEIMER
1. *Sound tough castings* that will safely withstand operating pressures and temperatures.	✓
2. *Uniform interchangeability of parts*, so that any replacement or repair part will be exactly the same size as that which is to be renewed.	✓
3. *Solid Disc* (not cored) that will not distort under temperature variations and pressure of the fluid handled.	✓
4. *Heavy renewable bronze seat rings* with special machine finish, and strong deep-cut threads that can be screwed tightly into the body without risk of springing the rings.	✓
5. *An ample number of substantial lugs* on seat rings to facilitate renewal.	✓
6. *Bronze bushings* between the bronze stem and iron parts of valve, to prevent corrodible contact and consequent scoring of stem and packing, which causes leaky stuffing boxes.	✓
7. *Back-seat bushing* in bonnet to provide a tight seat for repacking valve in wide open position.	✓
8. *Disc perfectly guided* so that it rides straight and true to its seat without touching seat rings until near the point of closure. To ensure this perfect guiding, the *guide ribs in the body* as well as the guide channels in the disc must be accurately machined.	✓

The sure way for you to obtain *all* these service-giving and money saving features is to specify Lunkenheimer Iron Body Gate Valves. Through their use you will effect substantial reductions in maintenance expense and valve costs.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

CINCINNATI, OHIO, U. S. A.

NEW YORK CHICAGO
BOSTON PHILADELPHIA

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

If you have no copy of List Price Schedule R1 giving new list prices of Lunkenheimer Products, ask your local Lunkenheimer distributor or write The Lunkenheimer Co., Cincinnati, Ohio

BOILER MOUNTINGS — LUNKENHEIMER VALVES — LUBRICATING DEVICES

6-79-67

EVENTS OF WORLD significance transpiring in the Orient are heralded to the western world before the revolving earth can catch up with the clock. That's the speed of modern newspapers.

To produce the newsprint required by the daily press of the United States alone requires the timber grown through centuries on vast areas of virgin forests. To convert this timber into newsprint fast enough to feed the presses demands incredible speed at the wet end of the paper machines where the water is extracted from the web.

Because Hamilton Felts do this essential work more uniformly, more thoroughly, more economically and at higher speeds, Hamilton Felts are the standard equipment with leading newsprint mills.

• *From the finest tissues to the heaviest board, there is a Hamilton Felt that does your work better, faster and at lower cost.* •

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills, Established 1858 •

Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

Hamilton Felts

CUTS CONSUMPTION IN HALF
STOPS OIL CARRY-OVER
● EXCESS OIL in the exhaust steam from four 24 x 48 Corliss engines was causing considerable maintenance trouble in a northern paper mill. In an effort to eliminate this trouble, a Standard Lubrication Engineer was called in.
Under his supervision StanoCyl D was installed. With this product it was possible to reduce oil feeds until carry-over was practically eliminated. Inspection of valves and cylinders still showed excellent lubrication.
The surprised plant superintendent said, "We not only solved the problem of oil carry-over in the exhaust steam, but StanoCyl reduced oil consumption about 50%."
There is a definite reason for the low consumption records of StanoCyl. With its more complete atomization, less oil is required to reach and lubricate even remote engine parts. It clings to cylinder surfaces longer, again reducing the amount of oil required for adequate lubrication. Let a Standard Oil Lubrication Engineer demonstrate these facts on your engines. Let your cost records prove them.
Copr. 1939, Standard Oil Co. (Ind.)
STANOCYL
STEAM CYLINDER OIL
STANDARD OIL COMPANY (INDIANA)
LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING

...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRIC

THESE MANUFACTURERS FOUND THAT—

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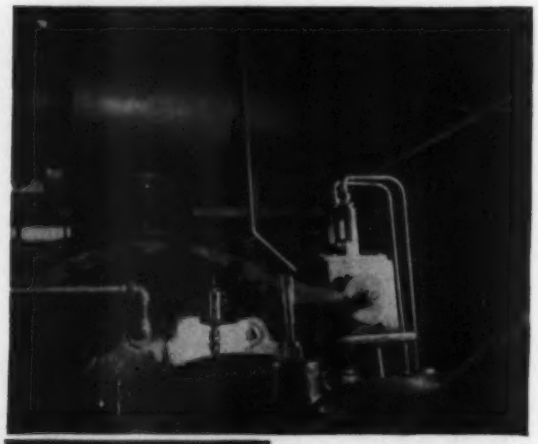

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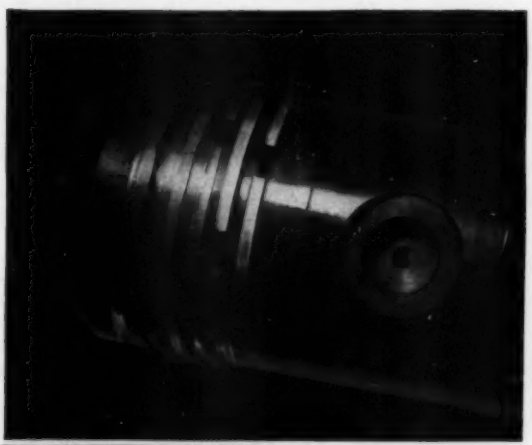

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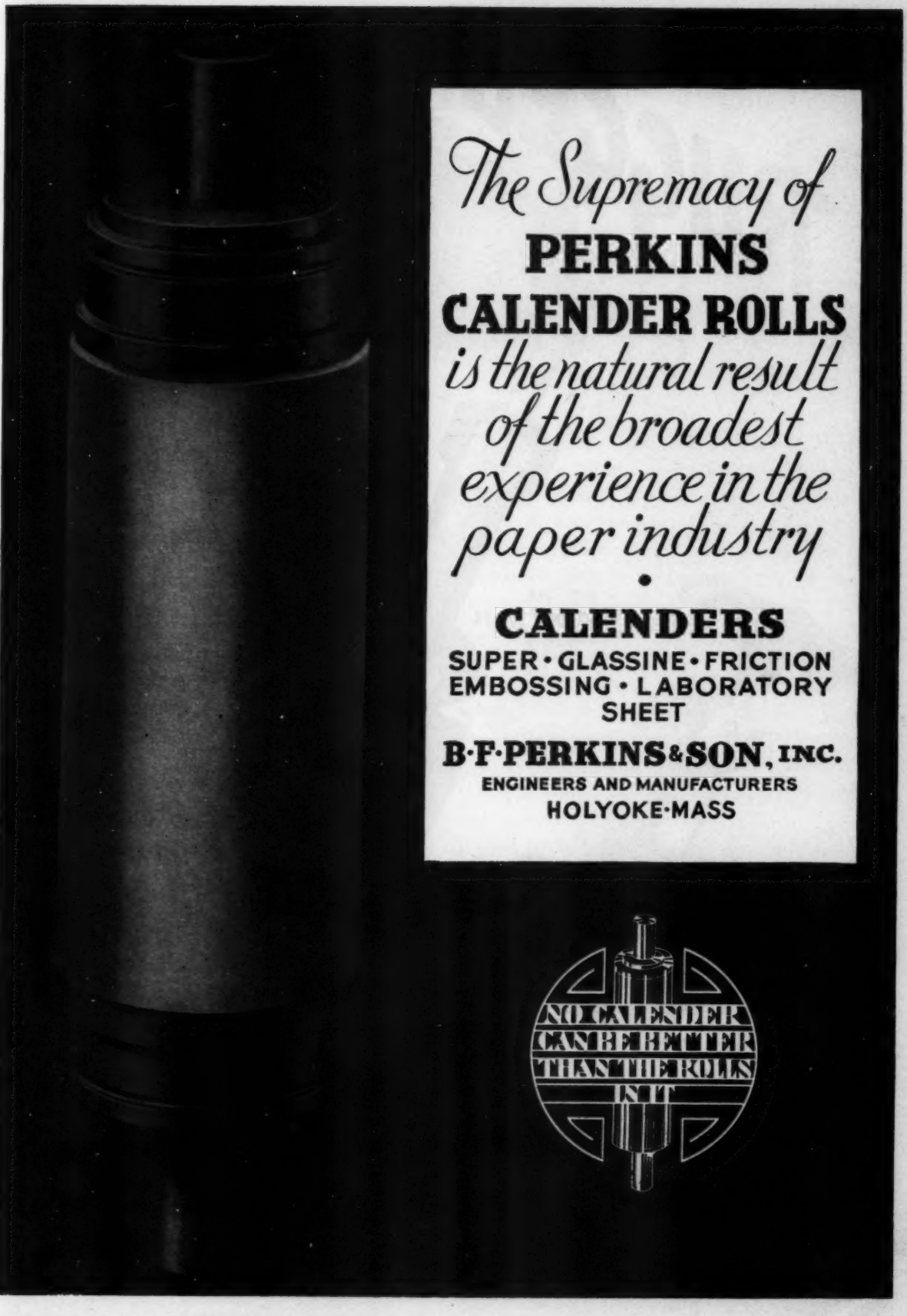

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RUGGED
FIG. 102
BRONZE GLOBE
VALVE.
FIG. 375
BRONZE GATE
VALVE.
FIG. 150
BRONZE GLOBE
VALVE.
POWELL
PAT.
WHITE
WSP
RUGGED VALVE
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IS ESPECIALLY DESIR-
ABLE TO THE ENGINEER.
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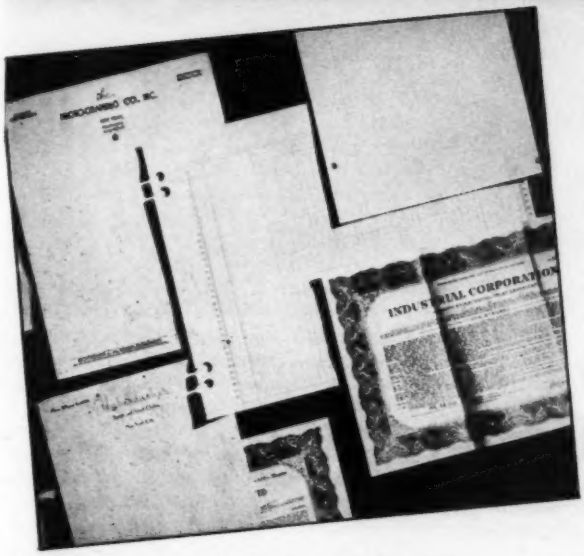

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Resistance of Paper to Natural Aging

FRED S. HANSON*

THE problem of the life of a sheet of paper is by no means completely solved today. Since John Murray's time, *(1)* the situation has been complicated by the introduction of wood pulps, and by the use of more drastic chemical and mechanical treatment in the manufacturing process, as well as by the addition of a variety of new loading and coloring materials. Each of these changes has been accused of decreasing the permanence and durability of paper. By permanence is meant chemical stability and by durability is meant physical stability and resistance to use.

Our present knowledge in the field of permanence of papers has been summarized in a very readable fashion by Julius Grant *(2)* in *Books and Documents* (1937). From both the practical and theoretical points of view our knowledge of permanence is insufficient. Much that we have learned about it has been through accelerated aging tests at high temperatures and observation in ultra-violet light. Although these methods are of considerable help, they cannot furnish the whole story of the resistance of a given sheet of paper to natural conditions.

Recent observations of an old book, IVLII *Caesaris, Scaligeri Exotericarum Exercitationum, Liber de Subtilitate,* AD Hieronymum Cardanum, a text in Latin on physics and natural science, dated 1576 (clo·Io·LXXVI), revealed some sheets had "aged" considerably—that is, they were brown in color and their strength was not great—while other sheets were still very white, and apparently still possessed considerable strength. The distribution of these "aged" and "unaged" sheets was random throughout the book in sections of from 10-50 of each kind. It was suspected that the book contained paper from two different lots. A number of possibilities presented themselves: (1) different furnish (different fiber content), (2) different iron content, (3) different filler. Furthermore, some pages in the book showed aging only under the printing—the margins were still white. It was suspected that this might be due to a difference in the ink or perhaps to contact with a different kind of printing plate.

It was decided to make a thorough investigation of the difference in these sheets in hopes of contributing to our knowledge of the characteristics of a sheet that will stand up under conditions of natural aging.

John Murray writes in a book published in 1824: "Allow me to call the attention of your readers to the present state of that wretched compound called Paper . . . . Specimens there are, that being folded up, crack at the edges and fall asunder; in others, being heated at the fire, similar ruin follows . . . . One letter which I forwarded by post fell to pieces by the way, and I have noticed more than once a description of writing paper that, being bent, snapped like a bit of watch-spring.

"I have in my possession a large copy of the Bible printed at Oxford, 1816 (never used), and issued by the British and Foreign Bible Society, crumbling literally into dust. No doubt it must be difficult to legislate on such a subject; but something must be done, and that early. I have watched for some years the progress of the evil, and have no hesitation in saying that, if the same ratio of progression is maintained, a century hence will not witness the volumes printed within the last twenty years— . . The application of quicklime to the rags, once prevalent in France, very properly subsequently interdicted, was a serious evil, for it actually decomposed the material. Are we entirely guileless?—such a process must needs disorganize the fibre. The Chinese dip their paper in alum water; it is thereby rendered brittle. Alum is clearly indicated, even to the taste, in the copy of the sacred volume already referred to. I take it, however, that the chief causes of destruction consist in the employment of sulphate of lime, etc., in the pulp, and bleaching the rags previously or the paper subsequently with oxymuriatic acid gas (Chlorine) . . . ."

The Investigation

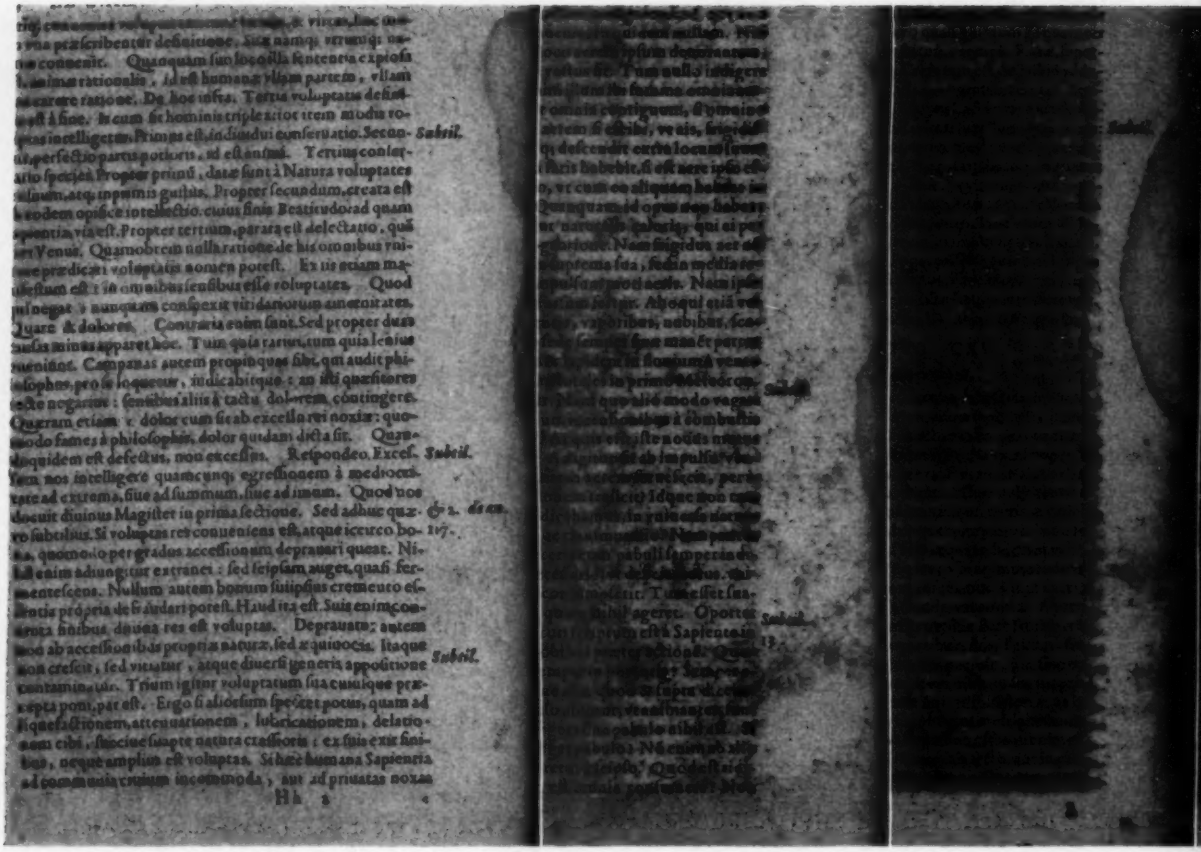
A few preliminary physical tests showed the brown sheets to be much weaker than the white sheets in every respect.

Both the brown and the white sheets gave the same fiber analysis. They are both of rag stock—a mixture of linen and cotton, with linen predominant. Both types of sheets contain three per cent of raw lignified linen fibers. Both sheets appear to have had the same mechanical preparation. The fibers are left reasonably long but are considerably broomed, and there is a great deal of very fine fibrous material.

There was a remarkable difference in ash content. The brown sheets gave ash values ranging from 0.75 per cent to nearly 1 per cent, while the white sheets gave ash values from 2.50 per cent to nearly 3 per cent. The ash from the brown sheets appeared to contain more iron. Since iron content is generally considered to be an important factor in the resistance of paper to aging, the ash was analyzed for iron by the colorimetric thiocyanate method.

Both sheets contain about 0.05 per cent of iron as Fe. If anything, the white sheets contain a trifle more than the brown.

*Portion of a thesis submitted by Mr. Hanson in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Master of Science from Lawrence College, Appleton, Wisconsin.



Typical pages from old Latin textbook showing results of aging. Left to right—Calcium carbonate content of first six sheets.

The difference in ash content between the white sheets and the brown is due to a much greater amount of calcium carbonate in the white sheets. There is sufficient calcium carbonate present in the white sheet to cause a considerable effervescence in hydrochloric acid solution. One set of analyses gave:

	White Sheet	Brown Sheet
Total ash	3.08%	0.94%
Co_3	1.24%	0.23%
SiO_2	0.11%	0.07%
Fe_2O_3	0.08%	0.08%
Al_2O_3	0.23%	0.22%
CaO	1.49%	0.20%
$CaCO_3$	2.70%	0.40%

This white sheet sample was slightly above average in ash content. Most of the white sheets contained about 2.6-2.7 per cent ash.

The pH of the aqueous extract from the white sheets was 7.5 while the pH of the extract from the brown sheets was about 4.9. Calcium carbonate will buffer a solution at a pH of about 7.5. The lower pH of the brown sheets can only be due to acid degradation products formed in the sheet, for as it is subsequently shown, there is no mineral acid present.

It was decided that the calcium carbonate content of the white sheets is the probable answer to their resistance to degradation.

A few physical tests showed that the centers of the "ink-aged" sheets are actually considerably more degraded than the margins of the same sheets.

The ink-aged sheets gave the same fiber analysis as the other sheets.

The ink-aged sheets gave ash contents of about 1.95 per cent, with a calcium carbonate content of about 1.3 per cent. This might indicate that this intermediate amount of $CaCO_3$ is enough to resist degradation in the margin but not in the center in the presence of the foreign materials introduced by the printing process.

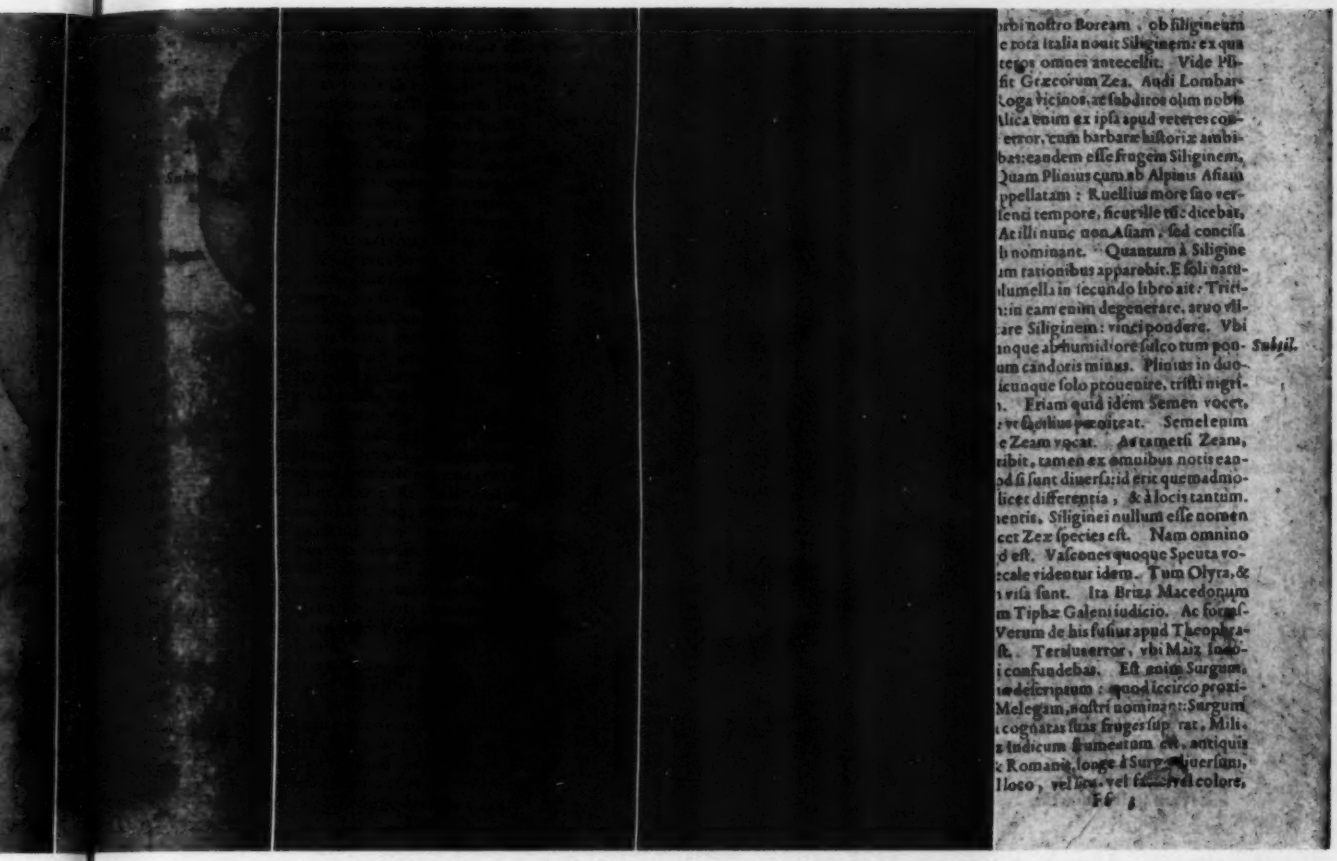
The margins and the centers of the ink-aged sheets had the same iron content—about 0.06 per cent Fe. If anything, the margin contains a trifle more iron than the printed area.

It was thought that some substance such as lead, manganese, copper, cobalt, chlorine, or sulphur might be present in the centers of the sheets but not in the margins. These substances could have been introduced by the printing ink, the printing plate, or by acid used to clean a printing plate.

Separate spectroscopic analyses of centers and margins, and also of white and of brown sheets, showed the presence only of iron, sodium, a little magnesium, a great deal of calcium, and perhaps potassium and barium in all the samples. The strong characteristic lines of lead, copper, manganese, nickel, barium chromium, and cobalt did not appear. The magnesium had not shown up in the previous gravimetric analysis, but is not significant.

According to the literature *(3), (4),* the printing inks of the period when this book was printed were composed of boiled linseed oil and smoke-black produced by burning pitch. Rosin and mineral oil were first added to ink in 1545 *(2)*. However, the Liebermann-Storch test for rosin and the fluorescence test for mineral oil were negative. The sheet itself contains no sizing material of any kind—starch, glue, wax, or rosin.

Linseed oil films on drying undergo oxidation, being partially transformed into a solid, resin-like, ether-insoluble material called "linoxyn" *(5, 6, 7, 8)*.



2.10, 1.62, 1.46, 0.86, 0.64, and 0.44 per cent respectively. Seventh sheet of same class as first, but brightened with oxalic acid.

In order to find a solvent which would remove the linoxyn and other linseed oil fractions from a sheet of paper, boiled linseed oil was brushed onto sheets of paper and allowed to stand for several weeks. A number of solvents were tried until one was found which seemed to remove completely the oil residues—namely, hot ethyl acetate acidulated with concentrated hydrochloric acid. This solvent also successfully removed oil residues from a number of printed sheets including one dated 1870.

The oil residues were extracted from both white and "ink-aged" pages with acidulated ethyl acetate and analyzed by a method given by Ingle and Woodmansey *(9)*. In this method the portion insoluble in "methylated ether" (a mixture of ether and methyl alcohol of definite specific gravity) is called "linoxyn," the portion soluble in "methylated ether" but insoluble in petroleum ether is called "partially oxidized oil," while the portion soluble in petroleum ether is called "unoxidized oil." This method was successfully applied by Ingle and Woodmansey to linseed oil films of varying ages in a study of the changes which take place on aging boiled and blown linseed oil films.

The results obtained in these analyses seem to show that the oil residues in the printed portions of the sheets showing ink-aging are more highly oxidized than the oil residues in the printed portions of the white sheets. Analyses of extracts from the margins of the ink-aged sheets show that the oil has diffused throughout the sheet in nearly equal amounts and seem to indicate that the margin contains more of the less highly oxidized fractions.

Iodine numbers were run on the oil fractions employing the micro method described by Ralls *(10)*. No iodine addition values were obtained, showing that unsaturated linkages are no longer present. Small iodine values of the order of 2.0 were obtained by substitution of halogen for hydrogen, but these values are without significance.

In tearing apart the binding of the book, it was discovered that all the paper in any one of the small signatures (forms) in which the book was bound was the same—that is, it was either white or brown or ink-aged. There were signatures of paper which were seen to be borderline cases between the white and the ink-aged and between the ink-aged and the entirely brown sheets. The signatures of paper were classified into six classes according to their apparent state of degradation:

Class *A*—entirely white sheets—no discoloration
Class *B*—sheets slightly discolored on printed portions
Class *C*—"ink-aged" sheets—centers brown
Class *D*—sheets in which the brown area includes centers and about half of margin
Class *E*—sheets uniformly brown
Class *F*—sheets uniformly dark brown

Ash determinations were made on two specimens of each class. The results on any two sheets of the same class were essentially identical. The ash content decreased progressively from 2.6 per cent for Class *A* to 0.9 per cent for Class *F:*

Class	Ash Content
A	2.60
B	2.12
C	1.96
D	1.36
E	1.14
F	0.94

The variable here is the calcium carbonate content—the other constituents are constant at between 0.4 and 0.5 per cent.

To determine if the calcium carbonate-filled sheets were equally resistant to heat aging and to light aging, samples were exposed in an oven at 105 deg. C. and in a carbon-arc fadeometer. Three hundred and sixty hours in the oven were required to affect seriously the strength of the sheet and during this time the color was essentially unchanged. After thirty-four hour's exposure to the fadeometer, the brightness of the white sheet had risen two points, and the strength was unchanged. These results seem to show that:

1) The white sheet containing calcium carbonate is very resistant to both heat and light aging.

2) The white sheets would have stood up—at least insofar as the action of light and air is concerned—if they had been individual papers rather than pages protected within a bound book.

3) Any of the brown sheets in the book were probably not the result of the action of light—or of air—when the book may have been left open at that point—at least insofar as the high calcium carbonate sheet is concerned.

The standard tests of basis weight, caliper, fold, tear, burst, opacity, and brightness were made on brown and white sheets and on both the centers and margins of ink-aged sheets. Without exception the strength tests are highest on the white sheets—lowest on the brown. The ink-aged sheets give intermediate strength values, with the margins showing considerably more strength than the printed areas. The brightness values decrease almost uniformly from about 60 in the white sheets to about 20 in the brown sheets. The opacity reading for the brown areas is somewhat higher than for the less degraded areas.

The chemical tests for pH, alpha and beta cellulose, copper number, and cuprammonium viscosity were made on brown and white sheets and on both the centers and margins of the ink-aged sheets. The white sheets show the highest alpha cellulose content, the lowest copper number, the highest pH, and the highest cuprammonium viscosity. The ink-aged sheets are intermediate in chemical characteristics between the white and the brown sheets, and the margins show considerably less degradation than the centers. A gamma cellulose content seems to be characteristic of the brown areas. Kraemer *(54)* has shown that gamma cellulose is a very highly degraded cellulose.

Treatment with aqueous oxalic acid raised the brightness of the whitest sheets in the book from 15 to 20 points. The degraded sheets in the book could be brightened about 8 points. In the case of the whitest sheets the rise in diffuse reflectance was greatest in the violet end of the visible spectrum, while in the case of the brown sheets the rise was greatest at the red end. At a wave-length of 530 millimicrons—in the green—the rise in each case is about the same.

The oxalic acid treatment was applied to a dozen old papers from the years 1690 to 1813 with a rise in brightness in every case of from 5 to 15 points.

The treatment removes iron, as shown by a thiocyanate spot-test, and in the case of calcium carbonate-filled sheet it probably converts calcium to the oxalate. Hydrochloric acid is also effective, but it causes considerable damage to the sheet. The oxalic acid treatment does not change the strength of the sheet perceptibly.

Results and the Literature

The results of the investigation appear to show a definite effect of a calcium carbonate content of about 2.5 per cent, in making an unsized rag sheet more resistant to natural aging. A survey of the literature shows divided opinions as to the effect of filler on permanence, but there are indications that a small amount should have a protective effect, while a large amount is undesirable, at least from the standpoint of durability. However, there is scarcely any data in any of the articles on the subject.

In 1823 John Murray *(1)* considered mineral loading, especially gypsum, as one of the chief causes of deterioration. In 1907, Herzberg *(11)* saw no reason why a paper containing mineral fillers should deteriorate any faster than one without fillers. In 1920, Aribert and Bouvier *(12)* were of the opinion that properly purified loading materials are not detrimental to the quality of paper, if they are not added in excessive amounts. In 1925, Kohler and Hall *(13)* stated that loading with china clay, gypsum, chalk, asbestos, and Swedish talcum, in moderate quantities, does not diminish the durability of the paper for keeping, but that it rather appears to exercise a preservative influence on the fibers. In 1927, Minor *(14)* wrote that clay fillers, which weaken the paper when made, protect it against aging. In 1928 Fox and Hebbs *(15)* considered that while mineral matter as such is permanent, its presence in high proportion has an adverse effect on folding properties and permanence. In 1930 the Special Committee of the Library Association of Great Britain *(16)* recommended that a number one permanent paper should contain no added mineral matter and that a number two permanent paper should not have an ash in excess of 5 per cent. Also in 1930, Minor *(17)* stated definitely that fillers and sizing offer such large protection against oven aging that it is quite easy to find papers made of worn rags or of ordinary sulphite which, because of their clay filler or glue sizing, are fully as permanent after oven-aging as papers made from the best of rags. Again in 1930 Kohler *(18)* reported that experiments at the Bureau of Tests in Stockholm indicated that fillers exert a protecting influence on fine papers in storage. In 1931, Strachan *(19)* remarked that kaolin closes up pores and protects fibers and that a mineral coat gives permanence to esparto papers. Also in 1931, Scribner *(20)* told of tests on book papers at the Bureau of Standards which indicated that most filling materials, such as the clays ordinarily used, have no harmful effect on the stability of paper and may even act in a protective way. In 1932, Kiely *(21)* expressed the opinion that the filler used in book papers aids in protecting the fibers up to a certain degree. Again in 1932, Klemm *(22)* expressed the view that mineral fillers are inert, they bring about no changes and exert no harmful action on the fibers, while they themselves are more permanent than the paper. In 1933, an anonymous article *(23)* reported that the Director of the British Museum remarked that the loading of paper with chalk to obtain more brilliant illustrations, especially in the case of color printings, causes deterioration. Also in 1933, Cyr *(24)* reported that paper pigmented with zinc sulphide is resistant to degradation as shown by the Bureau of Standards accelerated aging test. In 1935, in the Permanence and Durability Committee Report in the *Technical Association Papers (25)* it was stated that there is not complete agreement as to the significance of mineral fillers for permanent papers, and that too much material will probably reduce the durability, but a small amount of the proper filler does no harm. In 1937, Grant *(2)* concludes that the most permanent papers are not loaded apart from coloring pigments, and that anything over 5 per cent should be regarded as detrimental, especially as it may then tend to lower the initial strength.

The only explanation in the literature for the increased permanence of a lightly filled sheet is that the filler has a "protective," covering effect. Hall *(13)* says, "The good resistance of the mineral filled papers is probably due to the fact that the fillers have acted as some sort of a shelter against the sunlight." This explanation does not seem to be entirely satisfactory, primarily because it is physically impossible for a small amount of filler to cover the surface of enough of the fibers to be effective in this manner.

The results obtained in this investigation suggest that, at least in the case of a $CaCO_3$ filled sheet, the effect of the filler in maintaining a favorable pH within the sheet may

be the explanation of increased permanence. If there is sufficient $CaCO_3$ present, it can act as a buffer and resist the changes in pH resulting from the formation of acid degradation products of the cellulose.

The literature contains plenty of evidence that the permanence of a sheet of paper is dependent on its pH. John Murray's *(1)* statement in 1824 as to the deteriorating influence of alum acidity already has been quoted. In 1903, Winkler *(26)* found that the presence of free acid, even in very great dilution, acts injuriously on the paper, reducing its resistance to rubbing and creasing, and that the acid is not used up in the process of decomposition it causes, but goes on acting continuously until the paper is destroyed. In 1914, Bartsch *(27)* reported that the loss in strength of parchment papers is directly proportional to their residual acid content. In 1920, Aribert and Bouvier *(12)* declared that the most frequent and most harmful chemicals remaining in paper are free acids and free Cl. In 1928, Hoffman *(28)* stated that the pH of a sheet should certainly be above 4.7 to prevent deterioration due to acid, and in 1929, *(29)* he discussed the factors, including the consideration of permanence, which must control the alum content and acidity of the paper-making furnish. The Library Association report in 1930 *(16)* specifies a pH value of 5.5 to 6 for a number one paper. In 1937, Grant *(2)* concludes that acidity is probably the most important single factor affecting permanence. He points out that the nature of the acid (i. e., its strength) is of more importance than its quantity, and that for this reason the pH value may be of more importance than the total acidity as determined by titration. Although he admits that the pH value of a solid substance, such as paper, may have little meaning from a theoretical point of view, he maintains that the standard pH test on the water extract gives very useful information regarding permanence. According to his findings a pH value of 6.0 may be regarded as satisfactory; the nearer it is to 7 the better, although the sizing will suffer if the value is 7 or higher. He considers that values below 5.5 may be definitely detrimental.

In the presence of free mineral acid, the degradation of the cellulose is very probably principally a hydrolysis, catalyzed by the acid. The sheets under consideration in this investigation contain no mineral acid, and the results suggest that the degradation of the cellulose is catalyzed by the degradation products themselves—i. e., the degradation is autocatalytic. At the pH maintained by the $CaCO_3$ the degradation of the cellulose apparently does not start readily. Sufficient $CaCO_3$ may resist the formation of acid degradation products by a buffer action; but, *once started,* the reaction seems to go forward in spite of the presence of a small amount of $CaCO_3$ as in the sheets illustrated of Classes *E* and *F*.

Evidence is not lacking in the literature to indicate that the degradation of cellulose is autocatalytic. A low copper number has been accepted as a criterion of permanence *(2), (16),* and the copper number measures cellulose degradation products, especially those of an aldehydic nature. Lewis *(33)* finds that the resistance to degradation of pulps depends on their chemical purity (alpha cellulose content); and if the alpha cellulose content is high, the amount of degradation products present is of necessity, low. Torrey and Sutermeister *(34)* found high copper numbers and alpha cellulose contents of from 64.7 to 87.3 per cent in papers ranging in age from 900 down to 200 years, and, assuming that alpha cellulose content and copper number do not change materially on natural aging, they conclude that a high alpha cellulose content is not a prerequisite for permanence. But, the results of this thesis show fairly conclusively that alpha cellulose content and copper number can change materially on natural aging. Certainly it is not likely that sheets of original alpha cellulose contents of 64 per cent and 87 per cent were placed in the same book, and it is altogether unlikely that sheets were made with alpha cellulose contents of 63 per cent in the center and 71 per cent in the margins. Allen *(35)* considers that it is necessary to test for cellulose degradation products in order to obtain an idea of the permanence of a given sheet of paper. Finally, Fox and Hebbs *(15)* state that the possibility of catalytic oxidation and degeneration in good fibrous material due to the presence of small quantities of poor fibers in the furnish must not be overlooked. As still further evidence for autocatalysis, this investigation revealed that when booklets of white sheets were bound next to booklets of degraded sheets, the first page in the booklet of white sheets was always discolored and somewhat degraded.

The resultant product of the oxidation and aging of linseed oil varies tremendously according to the properties and treatment of the original oil and according to the manner in which the oil is exposed. However, it is generally conceded *(9), (30)* that in the first stage of the oxidation the unoxidized oil goes by way of the "partially oxidized" form to give largely the insoluble solid, linoxyn *(5, 6, 7, 8).* The following table by Ingle and Woodmansey *(9)* shows changes occurring in a film of cold-boiled linseed oil on exposure:

	Oil before exposure	Oil after drying: 3 days	5 days	7 days	10 weeks
	%	%	%	%	%
Unoxidized oil	100	45.7	33.9	10.9	17.5
Partially oxidized oil		52.5	50.1	43.6	28.9
Linoxyn		1.8	16.0	45.5	53.6

Under some conditions and on years of exposure the linoxyn has been observed to "go-back," partially, to give a sticky, semi-liquid substance called "super-oxidized oil," which appears in the analysis as "partially oxidized oil" *(31), (32), (9).* A "super-oxidized" linseed oil film may thus show a decreased linoxyn content with a high percentage of the "partially oxidized oil."

Analytical results for the extract from the printed portion of sheets where the cellulose is definitely degraded on the printed portion, show: linoxyn 55.0 per cent, partially oxidized oil 48.0 per cent, and unoxidized oil 1.9 per cent; while the extract from the printed portion of sheets with no ink-aging show: linoxyn 39.0 per cent, partially oxidized oil 45.5 per cent, and unoxidized oil 15.5 per cent. Checks were obtained on separate samples of ink-aged and white sheets within 2-3 per cent, and less, using a carefully standardized procedure. The significant difference in unoxidized oil content would seem to indicate that the first stage of the oxidation has been held back or inhibited, somehow, in the white sheets, while it has gone essentially to completion in the ink-aged sheets. The linoxyn content of the white sheets is much lower than that of the ink-aged sheets, but if the 15 per cent of unoxidized oil had been converted to linoxyn, the values would show that the second stage of the oxidation—the superoxidation or "going-back" process—has proceeded to approximately the same extent in both cases. The analyses of the extracts from the margins of the ink-aged sheets show: linoxyn 71.3 per cent, partially oxidized oil 19.3 per cent, and unoxidized oil 8.9 per cent. Checks were obtained for these values within one per cent. These values appear to show that the first stage of the oxidation has taken place, but that the superoxidation has not occurred to any great extent.

The higher calcium carbonate content of the white sheets may retard the oxidation of linseed oil as well as the degradation of cellulose. Calcium carbonate in a sheet of paper may certainly combine with the acids formed on oxidation of linseed oil in the sheet. It is rather generally accepted

that the oxidation of linseed oil is exceedingly autocatalytic *(37-42), (53)*. Even the lead, manganese and cobalt dryers which are added are thought to act only as pseudocatalysts to form enough of the oxidized products to further catalyze the oxidation. If this is true, it can be seen how calcium carbonate might function as an inhibitor by neutralizing acid catalytic products. A search of the literature revealed no study of the effect of pH on the oxidation of linseed oil. However, Eibner *(36)* makes the statement that the acid number of an oil film increases with age and that this explains the harder film obtained with paints containing basic pigments, which neutralize the slowly drying free fatty acids to give solid salts. Also, Rhodes, Burr, and Webster *(52)* found that the presence of calcium carbonate in an iron oxide pigment rendered it less active in accelerating the oxidation of linseed oil, and they believe that the calcium combined preferentially with the acids of the oil, thus preventing the formation of catalytic iron salts. Much of this was anticipated by Reid *(32)* in his original article, in 1894, announcing the discovery of the formation of "super-oxidized" linseed oil. He made several very interesting statements most of which have been overlooked by abstractors:

"In old prints and books, for instance, you will frequently have noticed a brown stain on the paper adjoining the print, or on pages opposite dark woodcuts. From such stained paper I have extracted a substance identical with this super-oxidized linseed oil. As the oil contained in the printer's ink liquefies, it is absorbed by and spreads through the paper, producing the stains which are too familiar to lovers of old books."

"Linoxyn itself is an inert substance, difficult to dissolve and to bring into combination with other substances. The product of its further oxidation, however, has a strongly acid reaction and forms solid compounds with most pigments of a basic nature. With white lead, for instance, a solid compound is produced which, though very friable and brittle, is quite solid and prevents the liquefaction of any paint of which that pigment forms a substantial part. Those who have attentively examined the darker portions of pictures will have noticed that cracks and flaws are there much more frequently than in the lighter portions of the same pictures. Most of the dark-coloured pigments are but slightly basic in their nature, and require a very much larger proportion of oil than the lighter colors. While white lead gives a good paint with but one-eighth of its weight of linseed oil, ivory black cannot be used with less than its own weight of oil, and lamp-black requires even a greater proportion. The larger the quantity of oil present, therefore, the less basic is the substance which alone is available for maintaining it in a solid condition. The surface to which oil paint is applied must necessarily exercise an important influence upon the conservation of the film. If it contains a basic substance or carbonate the effect of the liquefaction of the linoxyn may be partially neutralized."

As for the apparently lower state of oxidation of the oil residues in the margins of the sheets, we would expect the least easily oxidizable components to have diffused more readily from the printed area. Then, too, the oxidation may take place more slowly in the absence of the finely divided carbon and the other impurities in the printing ink which may have an effect of surface catalysis. In printing ink one cannot consider that he is dealing with a pure carbon, for as Lucas *(43)* points out, the best carbon inks contain some oil and tarry matter produced in the burning process. Reid *(32)* noticed the accelerating effect of carbon-black on the "super-oxidation" of linseed oil, and remarked the large quantity of oil necessary to give a hard-drying paint with carbon black. He explained the action as follows:

"When lamp-black, or any finely divided variety of carbon, is used as a pigment, the occluded oxygen in its pores has a most injurious effect on the consistence of the paint, and it is well known that such black paints have a great tendency to remain sticky or 'tacky.' I have known a manufacturer to prepare a special quick-drying oil for black paint with the inevitable result that the paint was worse than before."

Since the oxidations of both cellulose and linseed oil may be considered as autocatalytic, and since these reactions appear to have occurred simultaneously to a considerable degree in the case of the printed areas of the ink-aged sheets, the theory is ventured that the oxidations of cellulose and of linseed oil may be mutually autocatalytic. Some of the intermediate oxidation products of both substances are aldehydes *(44)* and the oxidation of organic aldehydes is known to be an autocatalytic process. Also, acids formed by the oxidation of linseed oil would tend to bring about the degradation of cellulose and perhaps vice versa.

The results of the iodine number determinations on the oil fractions are not surprising, since the iodine number of linseed oil is known to decrease progressively on aging *(6, 7, 8, 9)*.

The results of this investigation cannot be accepted as positive proof for any of the statements made on linseed oil, for several reasons. First, any solvent analysis method is always open to question. Second, some cellulosic material might be dissolved by ethyl acetate acidulated with HCl. Third, the solvent may have a chemical action on linseed oil residues. Certainly it probably breaks up any salts of the constituent acids, and it may possibly cause a certain amount of acetylation of the oil. The mineral constituents of the sheet are not responsible for any complications, for the extracted residues were analyzed for chlorides of calcium, and of iron and alumina, and the corrections made.

According to Grant *(2)*: "The average good black printing ink . . . has little or no effect on the paper." The investigation did not reveal that the ink was a good ink, but it did cause definite deterioration of the paper.

The method of brightening old papers with oxalic acid shows that some of the color is probably due to iron. It has been recognized *(45)* that "the presence of iron compounds in the ferrous form, first colorless, then susceptible of oxidation, with passage into the ferric modification of more stable character and greater depth of color is one of the chief factors causing discoloration of fine paper." It was observed during the course of the work that iron specks in the sheet had caused serious deterioration of the cellulose in the adjacent portions. Many investigators *(46-50)* ascribe the yellowing of rosin-sized papers to iron resinates which become discolored or cause yellowing of the cellulose. It is possible that iron linolates, etc., might form in a printed sheet and that these may account for some of the discoloration in the paper investigated in this thesis. Klemm *(46)* even went so far as to say that yellowing of groundwood-free papers is due to iron resinates. That yellowing, or at least "browning," may be due to other causes. As an additional possibility, the removal of some of the discolored linseed oil residues themselves may also contribute to the observed increase in brightness. The "superoxidized" portion is soluble in water to a considerable extent *(32)*.

The results of the physical tests show that the white sheets still have high strength, with the exception of fold, which is much lower than in a new sheet of rag paper. This is in line with the usual findings on old papers. A drop in fold may depend somewhat on desiccation of the cellulose. It may be mentioned here that the degraded sheets did not give a true burst, but a very gradual failure.

It may be noticed that the extreme edges of all the specimens are brown. This condition cannot be ascribed to exposure alone for the edges of the book were once painted red. These extreme edges were excluded from all tests made in this investigation. Upon extraction, the linseed oil from these edges was found to have the same characteristics as that from the unprinted margins of the ink-aged sheets.

A guess only can be ventured as to how the calcium car-

bonate came to be present in the sheets. It was very possibly accidental. If lime residues had been originally present, they would now be calcium carbonate, but this is not likely, for this much lime in the sheet would have caused considerable initial deterioration. Grant *(2)* makes the statement that before the invention of the bleaching process the color of the rags was frequently "improved" by the addition of white mineral substances. But he does not give any indications that this was done as early as 1576. It is interesting to note that Torrey and Sutermeister *(34)* found an ash content of 2.67 per cent in a well-preserved, 435-year old European paper. The ash was not analyzed quantitatively, but was reported to be alkaline to phenolphthalein and to contain considerable calcium.

The Conclusions

From the results of this investigation the following conclusions seem to be indicated.

1) A small amount of calcium carbonate, as a filler, made an unsized rag sheet more resistant to natural aging. The good sheets contained a minimum of two per cent calcium carbonate.

2) Printed sheets may show considerable greater deterioration in the printed portion than in the unprinted portion, after a long period of time.

3) The pH as determined on the water extract may be the most important factor in the permanence of a sheet of paper. The good sheets showed a pH of 7.5, the poor sheets a pH of about 4.9.

4) Alpha cellulose can decrease considerably and copper number can increase considerably under natural aging conditions.

5) The oil residues from printing ink may be extracted satisfactorily from a sheet of paper with acidulated ethyl acetate, at least in the absence of rosin.

6) Acids formed by the oxidation of linseed oil appear to have promoted the oxidation or degradation of the cellulose in the printed sheet. Calcium carbonate appears to have acted to neutralize the acids formed on oxidation of linseed oil, thus inhibiting the oxidation which is autocatalytic in nature.

7) After several hundred years linseed oil residues may become completely saturated and have an iodine number of zero.

8) Yellowing may occur in rag papers even in the absence of rosin size.

9) A treatment with aqueous oxalic acid will raise the brightness of old papers from 5 to 20 per cent as measured by the General Electric reflection meter.

10) The increase in brightness is due, in part at least, to the removal of iron compounds.

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The Centrifugal Pump . . .

And Its Maintenance

PART II — CONSTRUCTION, INSTALLATION and MAINTENANCE

CURT WEIL

In Part I, which appeared in the January issue of this magazine, Mr. Weil treated the subjects of Pump Design and Efficiency. Part II concludes the article.—Editor's Note.

Construction of Pump

FRICTION losses in pipe lines conveying pulp or paper stock are entirely different than the friction losses in similar or the same lines when pumping water. Curves in Figure 7 show the friction losses per 100 feet in a 10-inch diameter cast iron pipe carrying sulphite pulp at different consistencies. Figures for the same diameter of copper pipe would be about 0.9 as much; while those for the same size of wood stave pipe would be only about 0.75 as much.

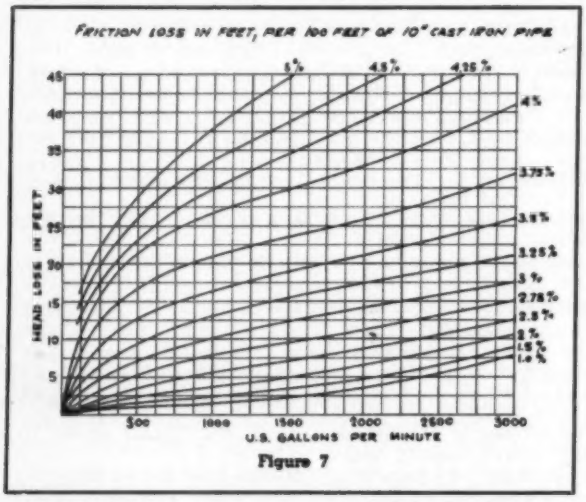


Figure 7

Groundwood and waste paper stock have lower friction losses than sulphite. Kraft or sulphate, on the other hand, has about the same friction losses as sulphite.

The reason why the curves for the higher consistencies of stock rise sharply at the lower velocities and flatten out at the higher velocities is that at the higher velocities the turbulences are less. Flow in such instances is approaching the movement of a solid plug.

The limit of stock consistencies for pumping is a question of economy. In most cases when long pipe lines with many bends are used, the stock should be thinned before pumping and dewatered again to the desired consistency at the point of use.

Stocks up to 3.5 per cent may be handled by a pump with about the same pumping efficiency as it would have in the pumping of water. The delivered capacity in both cases also would be about the same. At higher consistencies, however, the capacity of the pump and the head against which it can operate drops considerably as compared to water. Consistencies of 5.5 and 6 per cent will cut the efficiency of a pump to about 50 per cent, depending on the capacity and of the efficiency of the pump when pumping water.

Figures 8 and 8a show a specially-designed stock pump with a propeller in the suction ahead of the impeller and with baffles in the suction nozzle. The conveying capacity of the propeller is larger than that of the impeller. Therefore, the excess stock is recirculated in the suction chamber. The baffles serve to retard pre-rotation and together with the propeller assure a practically uniform pressure in the suction chamber between the propeller and the impeller; while a very large suction assures a good flow to the pump with even very free stocks which have a tendency to dewater in front of the suction and bridging over. The impeller is usually of the two or three vane type and is provided with vanes on the back to prevent the accumulation of stock between the back of the impeller and the casing. By using an impeller with back vanes, the space between the back of the impeller and the casing is always kept clean, a feature of special importance where stocks have the tendency to pack hard in this area and to dry thereafter a prolonged shut-down period. Accumulation of stock in the area also would increase power requirements.

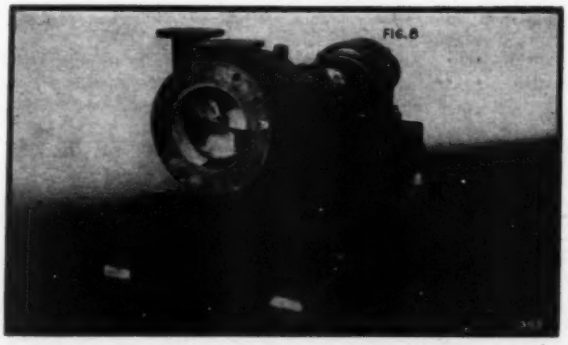
This particular pump is equipped with two sleeve bearings, one for radial load, and one for radial and thrust load, a design which many mills still prefer to the ball bearing type and which at the lower speeds, recommended for all stock pumps, renders very good service.

On installations where constant delivery is important and where the head on the suction varies, such a special pump is well justified.

Figures 9 and 9a show a pump for pumping liquor. It is a pump with some special features.

The suction head is provided with a handhole for inspection and cleaning and also with a vent opening in case the liquor contains air or vapors.

Usually the air is thrown to the center of the impeller because of the higher specific gravity of the liquor. It accumulates at the eye of the impeller and, in the course of time, forms a large air bubble which will block the entire entrance of the pump. By connecting the vent with



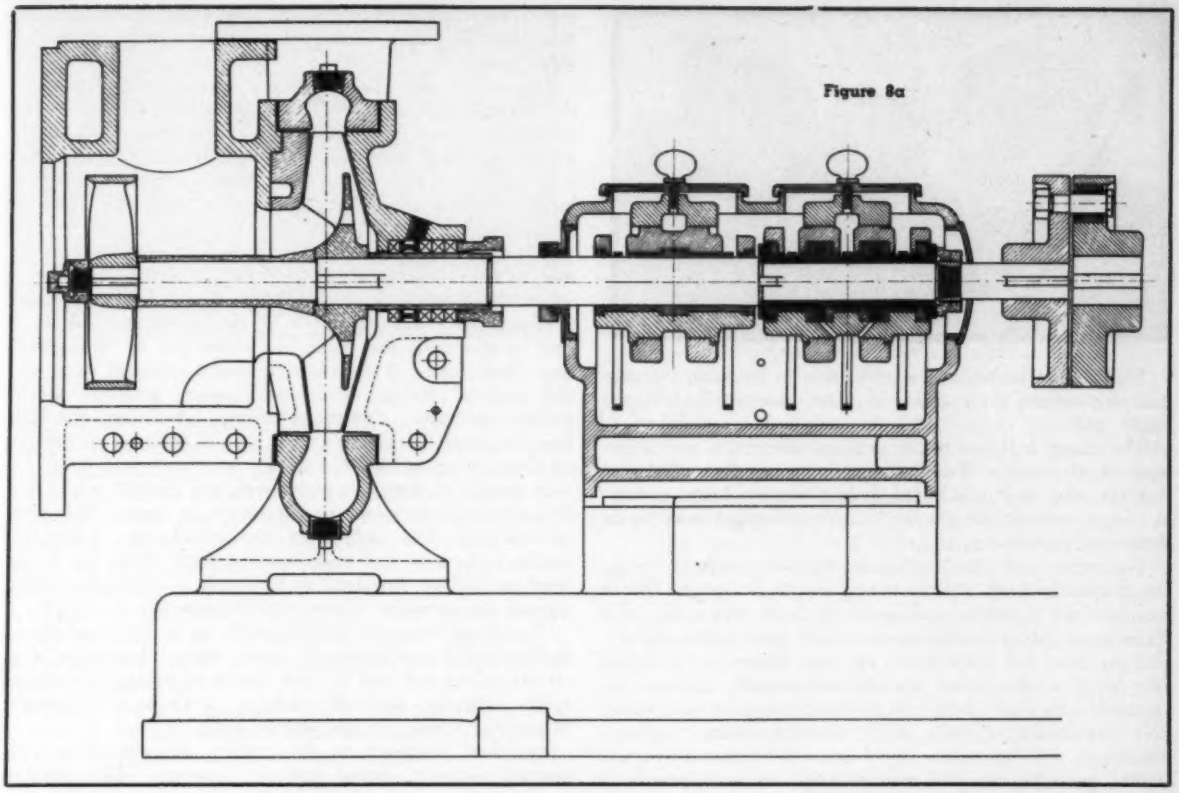


Figure 8a

the atmosphere, the air escapes, thus freeing the pump from air binding.

The impeller is securely fastened to the shaft by means of key and locknut. Likewise, because of the importance of proper clearance between the impeller and the casing exchange sideplates are provided.

If the clearance between the impeller and the casing is not held within proper limits, volumetric efficiency is reduced considerably by the recirculation of liquid from the pressure side to the suction side through the clearance. This clearance cannot be made too small for conveyor-type pumps because experience has shown that plates have worn out in a very short time. In consequence, the high efficiency of a pump with close clearance, as obtained on the test run, is not maintained after a short period of operating service.

A good pump, especially when pumping abrasive liquids such as raw green liquor, always should be provided with exchange sideplates which can be easily and quickly exchanged at moderate cost. These plates usually are bolted to the casing to prevent turning and are accurately machined to the contour of the impeller.

In some pumps, the plates are adjustable so that the original clearance between the impeller and the plates can be restored, when worn. In the pump shown in Figures 9 and 9a, this adjustment is made by moving the entire rotating member toward the suction side wearing plate until desired clearance is obtained. Movement is accomplished through an adjustment bolt at the rear of the bearing. After the adjustment is made, the rotating member is locked in place.

A shaftsleeve of a specially hard material, securely fastened to the pump shaft where it enters the stuffing box, protects it from excessive wear. The sleeve can be replaced easily when worn out.

The stuffing box is water-cooled to prevent the heat of the hot liquors from being carried through the shaft to the bearings. This water-cooling not only keeps the shaft cool, but also preserves the packing.

In some extreme cases, where pumps have to work in very hot rooms, such as in digester buildings, the bearings are surrounded by water jackets through which cold water is circulated.

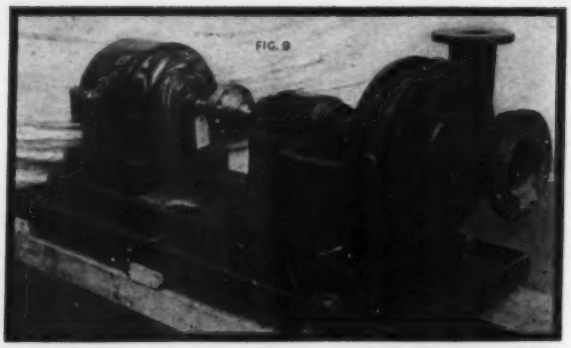
The stuffing box packing of a pump commonly consists of several rings of square cross section; and is made of various materials depending on the type of pump service.

An extraordinarily long stuffing box is used with the pump illustrated in Figures 9 and 9a in order to accommodate an added number of packing rings. Such design makes it unnecessary to tighten up the gland sufficiently to cause excessive wear on the shaft sleeve.

Frequently the packing of a stuffing box is divided into two parts with a ring. This ring, called a water seal ring, provides a space between the two halves of the packing for the entrance of grease and water. This arrangement prevents leakage through the gland as the pressure of such seal-water as is used is always higher than the pressure at this part of the pump.

When pumping liquids containing abrasives, it is of advantage to provide an outlet for the seal-water. By means of small valves in the feed and discharge line of the seal-water, the pressure in the seal-space can be regulated so that no seal-water enters the pump to dilute the liquor and so that no liquor can leak out. By providing a seal-water outlet, abrasives in the liquor which have passed the first rows of packing rings are flushed out so that they can do no damage to the outer rings, increasing the life of a packing.

While most ordinary pumps have split-cases to permit easy removal of rotating members without disconnecting the suction and discharge lines, this pump has a solid case. However, it is provided with a special coupling which allows the rotating element to be moved back a few inches and then to be lifted out of the case.



This design makes it less expensive to machine the case and also reduces the number of joints through which liquid could leak.

The casing is bolted to the pedestal, assuring a true alignment of the shaft. Two ball bearings, one for radial and one for axial and radial load, reduce friction losses greatly. A slinger between the bearings and the pump prevents liquor from entering the bearings.

Figures 10 and 10a illustrate a propeller pump for agitating purposes. Such a pump is very simple in design. Wide passages and a simple guiding of the stock assures the least damage or change to the fibers. Stock both enters and discharges from the propeller in an axial direction. It enters the pump at the lower opening horizontally, and is discharged vertically. Baffles in the center piece prevent excessive pre-rotation, which, if it occurred, would decrease efficiency.

The propeller pump is recommended for use where large volumes of liquids have to be handled against a low head. It is of decided advantage over the ordinary paddle agitator for stock chest agitation and for color mixing. The paddle agitator, in many cases, especially on heavy stocks, only cuts through them; uses considerable power; and does no mixing. The propeller pump, on the other hand, will thoroughly mix dyes or colors throughout a chest charge in a very short time.

Figures 11 and 11a illustrate a special decker pump of the vertical type and which can be bolted directly to the discharge trough of a decker. A very large streamlined suction opening leads the stock directly into the impeller; and baffles in the suction minimize its pre-rotation, the baffles, in this case, being part of a renewable liner or wearing plate. There also is a handhole in the suction which makes it possible to clean the pump without difficulty and without prolonged interruption of service in case it should be clogged or in case stock should dry in it during a shut-down. The casing is of the split-type, making it easy to dismantle the pump for inspection or replacement in a short time. Two water-lubricated bearings of a special material for the radial load assure smooth running without vibration. The upper bearing, which takes the axial load or thrust, is oil lubricated; and is designed to prevent oil from dropping into the stock.

A special packing-less pump with top suction, which can be used either for stock or for liquor, is shown in Figures 12 and 12a. The pump is of the vertical type; is installed within a chest or tank; and has its motor above the liquid level on top of the chest or tank. It is especially advantageous for pumping liquor from shallow pits or sumps.

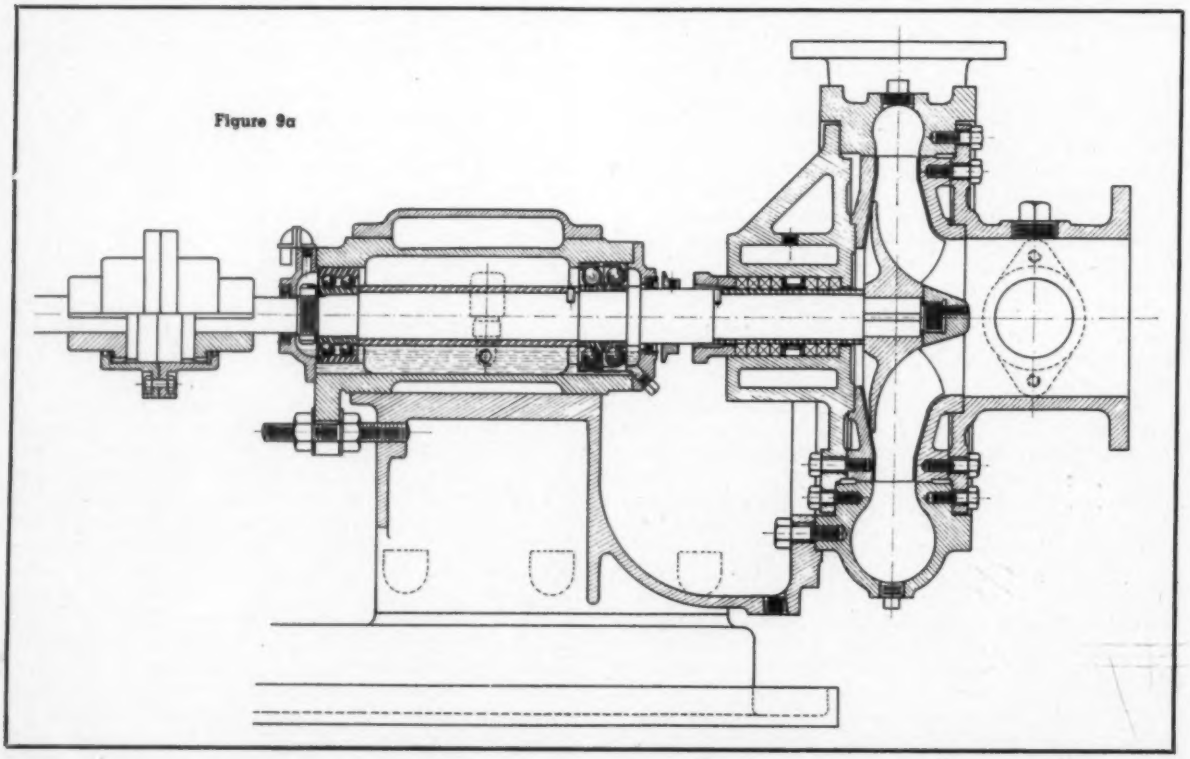
The pump is easy to install; needs no heavy foundations; and takes only a minimum of space. Since it has no packing, all difficulties and loss of time due to repacking are eliminated. Likewise, since the pump as a whole is submerged in stock or liquor, no leakage can occur.

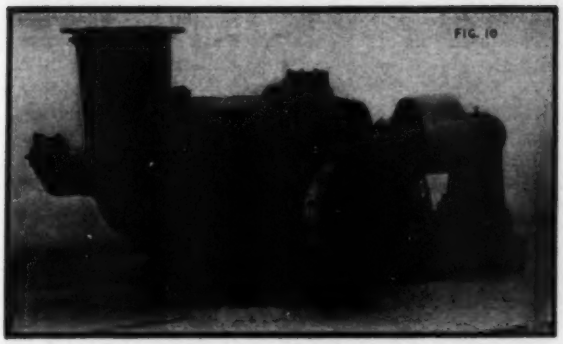
Overflow openings in the column or supporting pipe prevent rising of liquid into the bearings. The bearings are of the same type as the bearings of the decker pump.

Pump Installation

The best centrifugal pump will not give satisfactory service unless installed properly. It should be installed so that

Figure 9a





the operator has easy access to all parts and so that he can inspect it during operation to prevent anything from going wrong at some inopportune time. Power bills and costly shut-downs can be reduced greatly by regular inspection of glands and bearings. A substantial foundation, preferably of concrete, should be used to avoid vibration which might cause faster wear and shorten the life of the pump. The foundation also should be raised from the floor line and should be about 6 inches larger than the base plate of the pump to allow for a catch groove to be concreted around the pump for the collection of drippings. The groove should be piped to the sewer. No drippings should be allowed to flow on the floor both from the standpoint of safety and of general appearance.

When a pump is installed, special care should be taken to have it correctly aligned with the driver. The pumping unit must be set level in every direction. A flexible coupling, unless of special design, will not compensate for misalignment. Usually the pump is shipped already assembled with motor; and the manufacturer takes care of the alignment. Nevertheless, before grouting the foundation, the alignment should be checked to ascertain if any misalignment had been brought about through shipping or rough handling.

Every base plate, no matter how heavy, is elastic and will spring to a certain extent. Any sprung plate can be brought back to its original shape by using wedges which can be left in place when grouting.

Care should be taken in connecting the pump with the pipe lines. All pipes should line up naturally. They should not be forced into place with flange bolts, as in doing so, the pump may be drawn out of alignment.

Very often, heavy valves are flanged to the suction and discharge of a pump. Such valves and all pipes should be supported independently of the pump, especially where hot liquids are handled and temperature changes occur, to prevent strain from being transmitted to the pump.

After the pump is connected with the pipe lines, it should be checked again for alignment by turning the shaft by hand with the packing loosened. The shaft should turn easily. If a slight rubbing is felt, it is a sure sign that the rotating member is not in line with the pump housing.

The suction connection of a pump with a chest or tank is very important. It should be as short and as direct as possible. Elbows or other flow restricting elements should be avoided. The pump, especially when handling high consistency stock, always should be installed so that flow to it is by gravity. It should be put in a pit if the bottom of the chest is at the same level as the floor line. Such a pit location makes it possible to empty the chest.

As the liquid level in a chest varies considerably when intermittent processes are used, the head of a pump always should be figured at the lowest point. To overcome most difficulties, a large oversize suction pipe should be used.

High consistencies cause enormous friction losses in small pipes. They can be so great that a small suction head will not overcome the friction and, in consequence, stock will not flow to the pump. This condition develops especially with free stock where the water separates easily from the fiber; and, when the water drains from the fiber, the stock finally becomes so heavy that it will not flow but rather bridges over and blocks the suction. In many cases, this difficulty is mistaken for air binding.

A suction pipe, depending on the freeness of the stock, should be dimensioned so that a 2 per cent stock should have a suction velocity not higher than 4 feet per second, while a 6 per cent stock should have a velocity not over 1 to 1.5 feet per second. The pump manufacturer usually recommends the proper suction size for a pump, and the recommendation of the manufacturer should be followed.

The discharge line also should be large as pumping costs are considerably reduced when liberal pipe lines are installed.

Figure 10a

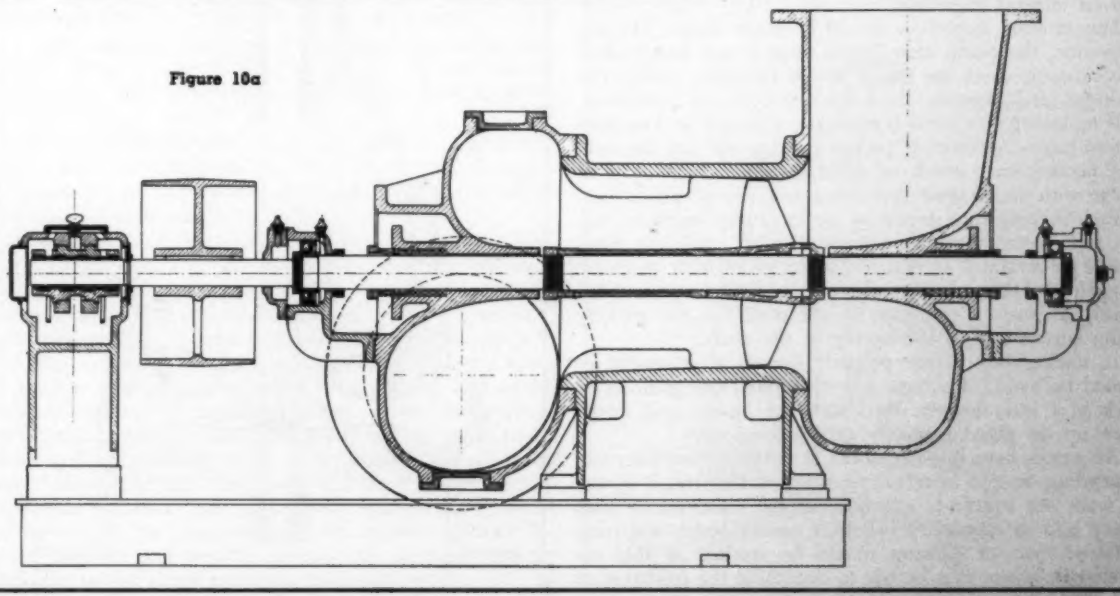


FIG. 11

Pump Maintenance

After a pump is installed, maintenance becomes an important factor. It can be a costly item if necessary care is not taken. Pump failures, which may and usually do occur at most inconvenient times, can cause great losses in production. The best remedy for these failures is to educate the operator or the man responsible for the pumps on pump care. In larger mills, a special man should be employed for the sole duty of always keeping the pumps in good operating condition.

Best results and trouble free operation can be obtained by having two kinds of inspection—an external inspection and an internal inspection.

The external inspection should be made daily. On this inspection, the pump man should inspect each pump while it is running, check the glands and if necessary, replace the packings, and likewise, check the bearings and lubrication.

If repacking of a gland is necessary, it should be done with utmost care. A carelessly packed packing will not last long and possibly may result in damage to the shaft or shaft sleeve with an incident shut-down and loss in production.

Each packing ring should be cut to proper length so that the ends come together without overlap; and the rings should be arranged so that the joints of adjacent rings are staggered. Likewise, the packing should not be pressed too tightly as such a condition might result in the packing being burned and in the cutting of the shaft.

A stuffing box is not properly packed if it cannot be turned by hand. The best way to tighten the gland is to pack it a little loosely, then start the motor, and finally draw up the gland gradually until leaking stops.

As pumps have to be repacked at different time intervals, depending on type of service and liquids handled, it is well to work out a definite schedule for the repacking of each pump and to tabulate it. Pumps having water seal rings between rows of packing should be marked so that the pumpman knows that he has to determine the condition of the inside packing as well as the outside packing. If he fails to make this observation, after a short time the inner packing will be pressed so far in that the seal ring is no longer in contact with the water seal inlet. In consequence, the seal water will not flow in the seal space and do the work it is supposed to do. The result is an overheated packing gland and shaft, and a dried out packing which causes wear on the shaft and thus shortens the life of the pump. In many cases, where hot liquors are to be pumped and the packing boxes are not water-cooled, a small stream of water should be spilled over the packing box of each pump.

Two types of pump bearings are generally used—the oil lubricated sleeve bearing and the ball or roller bearing. Before starting a pump, its bearings should be cleaned thoroughly since dirt or other foreign matter might get into them during shipment or erection.

The manufacturer usually recommends the proper oil for the bearings. In most cases, it is a neutral mineral oil of about 300 seconds Saybolt viscosity at 70 deg. Fahr.

After a pump is placed in operation, there should be a daily inspection of the bearings and a daily checking of the lubrication. The oil should be changed and the bearings cleaned at such time as the oil becomes dirty. Likewise, the operator should make sure that the oil rings turn freely; and that liquid from the pump is not entering the bearings.

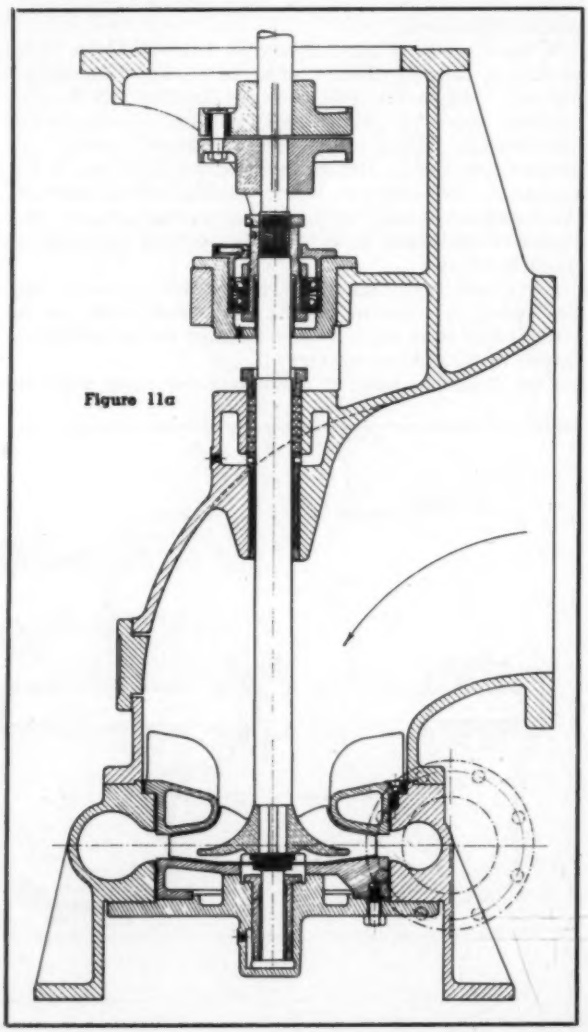


Figure 11a

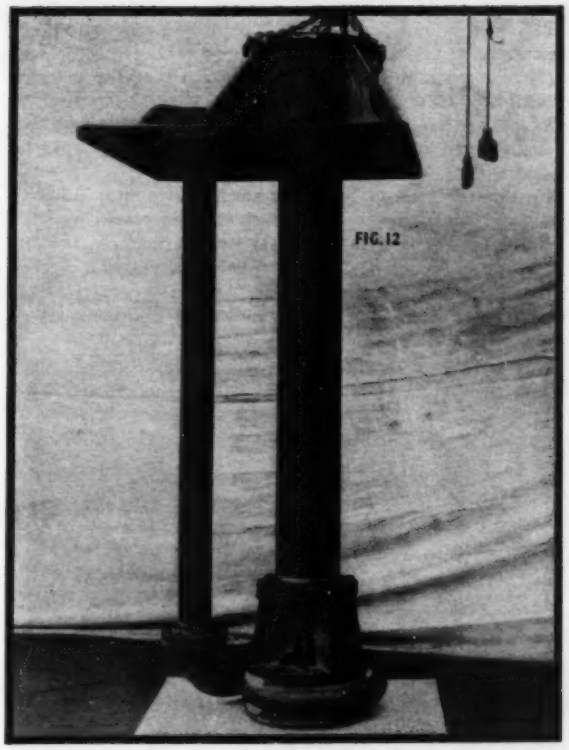


FIG. 12

In case the liquid has entered the bearings, in order to prevent damage, the entire supply of oil should be drained from them, the bearings washed with gasoline, and then refilled with new oil.

Proper lubrication of ball bearings is most important. If the bearings are oil lubricated, the same oil as for sleeve bearings might be used.

Standard greases for ball bearings also are available.

In most cases, grease-lubricated ball bearings will overheat from too much rather than too little grease. Therefore, the cause of overheating of such bearings should be investigated before putting more grease in them. It is very important to use only clean grease as foreign matter in the grease may destroy a bearing in a very short time.

A time schedule covering the frequency of greasing cannot be given. So much depends on the service and the installation. The frequency of the operation must be found by experience.

Internal inspection also should be made at a scheduled time. Such an inspection can be arranged best during a shutdown period. It includes the dismantling and thorough inspection of each pump.

When the clearance between the impeller and the side plates of a pump has become so large that the efficiency of the unit is decreased considerably, the plates should be adjusted, or, in case adjustment is not provided for, replaced with new ones. Adjustment should be made very carefully and after making it the shaft should be turned several times by hand to find out if the impeller is rubbing against the plates. Rubbing of the impeller against the plates would cause a power increase and might be dangerous to the pump motor as fuses of a size which will not blow out when the power requirements of the pump become too high usually are put in the power line. The pump manufacturer should supply data to the pump user on the desired clearance between impeller and wearing plates, this clearance varying according to the liquid being pumped, and on the limit of allowable wear to keep a pump at its greatest possible operating efficiency.

The pump casing should be inspected each time a pump is taken apart as considerable wear occurs in the casing especially where liquids containing abrasives are pumped or where stock is pumped at high velocity, some stock having a very abrasive action at high velocity.

Wear is most visible at the drain and vent holes because most of the pipe plugs are not screwed in far enough to be flush with the casing. Turbulences occurring at these points may be so great that a case will wear out very rapidly. When caustic liquors or acids are pumped, a break in the casing might endanger the life of the operator. Therefore, it is advisable to inspect the positioning of the plugs of each new pump, and in case they are not flush with the casing, replace them with longer ones.

A worn out sleeve or shaft always will make a pump leak so there also should be a regular inspection of these parts. To prevent excessive wear on the sleeves, a pump never should run for any length of time with a closed discharge valve. High pressure built up by such a closed valve will cause considerable wear on the sleeves due to heating. Neither should the pump run empty, as there is danger of injuring some parts of it. The pump is designed in such a way that the liquid within it acts as a cushion or lubricant. A pump running empty will be ruined in a

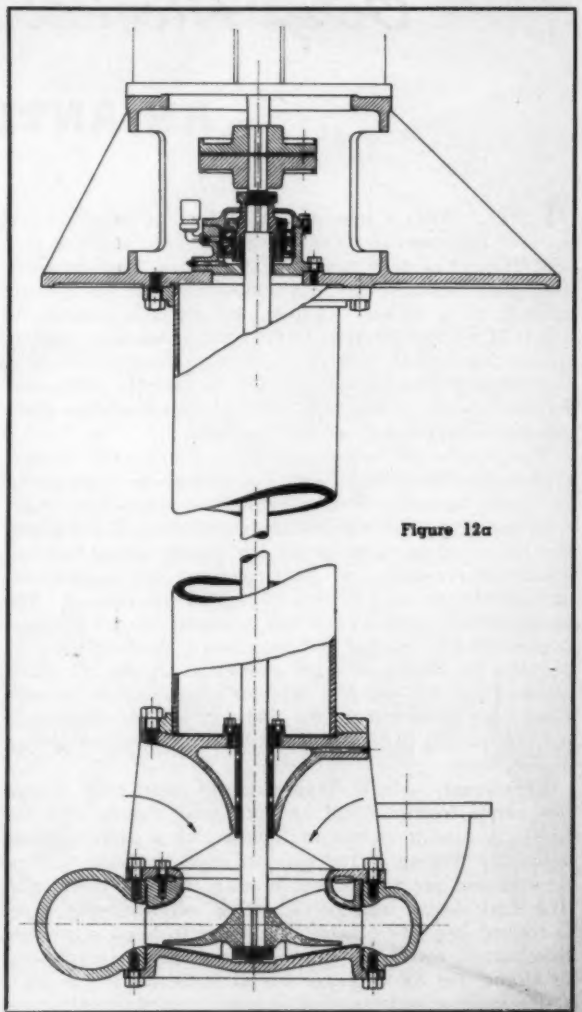


Figure 12a

very short time by overheating and vibration. A pump handling a liquid which flows readily while hot but is sticky when cold, such as heavy black liquor, should be started carefully after a prolonged shut down period. The pumpman must make sure that no hardened liquid is in the pump when it is being started. Otherwise there is apt to be a broken shaft or impeller as a consequence.

The position of the valve in the discharge line, when starting a pump, should be determined by consulting the power curve of the pump characteristics.

Straight vane impellers have a rising power curve with increased capacity. Therefore, such a pump should be started with the discharge valve closed as the load on the motor is reduced from 25 to 50 per cent of full load. Then the valve should be opened gradually to bring the pump to full capacity.

Mixed flow impellers, on the other hand, have an almost even power curve regardless of capacity. Therefore, it does not make much difference if the discharge valve on such a pump is closed or open.

Propellers have the highest power reading with the discharge valves closed. Such a pump, therefore, should be started with the valve wide open.

By observing these few suggestions, pumping costs, repairs and shutdowns will be kept at a minimum and the life of each pump greatly prolonged. Certain repair parts for each pump, such as a set of wearing plates, shaft sleeves, bearings and an impeller, however, should be kept in stock for the making of quick repairs in case of emergency.

The illustrations that appear with this article were supplied through the courtesy of Warren Steam Pump Company, Inc.

Octyl Alcohol . . .

AN ANTI-FOAMING AGENT

R. K. KENNEDY

A RELATIVELY new industrial chemical, octyl alcohol, has been found to have a unique property—the ability to prevent foaming in many processing operations. This chemical, originally developed in 1933 and also known as 2-ethylhexanol, is a primary alcohol. Its chemical formula is $CH_3(CH_2)_3CH(C_2H_5)CH_2OH$. It is a colorless, slightly viscous liquid with a relatively high boiling point. It is only slightly soluble in water, but is miscible with most organic solvents. Chemically, octyl alcohol resembles other monohydric alcohols in its usual reactions.

The most recent investigations concerning uses of octyl alcohol have been made with the purpose of determining the correct amounts for the prevention of foam. For certain applications in paper manufacturing operations, it was found that the use of too large an amount actually caused foaming instead of preventing it. This condition was quickly corrected when the amount of octyl alcohol was reduced. The optimum anti-foaming effect was produced when a saturated solution of octyl alcohol and water was formed—about 0.14 per cent by weight of octyl alcohol at 25 deg. C. It is believed that this rule may hold for other solutions as well. More octyl alcohol than this probably will be required to prevent foaming of solutions in which it is more soluble than in pure water.

Experiments recently completed with paper pulp showed that octyl alcohol should be introduced directly into the foam. A case of exceptional foaming in a paper machine with pulp flowing at 100 gal. per min., required 7 cc. of octyl alcohol per min. to knock down the foam completely. The octyl alcohol was sprayed at the roll where the paper is formed and where foam, if allowed to build up, would have marred the sheet. Even in this extreme case, the cost of alcohol per ton of paper was so small that it was not a factor in the consideration of its use.

To prevent foam in beaters, it has been found best to spray octyl alcohol over the surface of the pulp before agitation is started. When the correct amount has been added, the beater is started and small additional amounts of octyl alcohol are sprayed on from time to time to make up for losses due to solution. The usual amount of octyl alcohol required is from 0.0005 to 0.005 per cent of the amount of pulp.

At one plant, in coating gelatin spreads for stencils, air bubbles frequently used to form, causing trouble from pinholes. The addition of octyl alcohol up to 1 per cent in the gelatin base greatly reduced the air bubbles and eliminated the pinholes. Octyl alcohol can also be used as a foam breaker in many other kinds of paper-coating work.

The physical properties of octyl alcohol are listed in the following table:

Molecular Weight	130.14
Boiling Point, deg. C	184.6
Specific Gravity at 20 deg. C	0.8344
Surface Tension at 22 deg. C., dynes/cm.	30.0
Viscosity at 25 deg. C., poises	0.705
Specific Heat at 25 deg. C., cal./gm.	0.564
Latent Heat of Evaporation at Boiling Point, cal./gm.	92.8
Flash Point (A. S. T. M. Open Cup), deg. Fahr.	178
Solubility in Water at 25 deg. C., per cent by weight	0.14
Solubility of Water in Octyl Alcohol at 25 deg. C., per cent by Weight	2.55
Coefficient of Expansion per deg. C.	0.000875 to 20 deg. C. 0.000902 to 55 deg. C.

PAPER SKETCHES

ANCIENT ROMANS ARE SAID TO HAVE MADE BETTER, WHITER SHEETS OF PAPYRUS THAN THE EGYPTIANS, BECAUSE OF THE GREATER ATTENTION THEY GAVE TO WASHING, BEATING, GLUING, SIZING AND SMOOTHING OF THE SHEETS. . . .
XX ANTILES OF TOUGH, WATER-PROOFED PAPER COSTING ABOUT 18 CENTS EACH ARE USED WIDELY AS RAINCOATS BY JAPANESE COOLIES.
SHEETS OF IMPORTED CHINESE WALL PAPER, 10 FEET X 3½ FEET IN SIZE, WERE OFFERED FOR SALE IN PARIS, IN THE YEAR 1770, AT A PRICE OF 24 LIVRES (ABOUT $5.58) APIECE, IN LOTS OF EIGHT!
A METHOD OF DE-INKING WASTE PAPER WAS INVENTED AND PATENTED ABOUT 1800 IN ENGLAND BY MATHIAS KOOPS.

Left—Low lift trucks transporting skids of paper rolls. Center—Telescopic fork truck facilitates storage. Right—Center-control type fork truck equipped with motorized revolving roll mechanism.

Union Bag Uses ELECTRIC TRUCKS

JOSEPH A. CRONK

AFTER making a careful survey of materials handling equipment, the Union Bag and Paper Corporation, Savannah, Georgia, selected and installed several types of Automatic Transportation Company electric trucks for the handling of its roll paper and its lap pulp.

Included among these units are five low-lift trucks, each with a capacity of 6,000 lb. and which together handle an average of 12,000 tons of roll paper on skids each month from the finishing room to storage, and from storage to shipping or to the bag factory for bag conversion. An overhead crane positions the rolls on the skids in the finishing room and there they remain until picked up by one of the five electric trucks. Each skid as loaded weighs about two tons.

In addition, two telescoping trucks, each of 4,000 lb. capacity, are used for transporting large rolls of kraft board from the machines or storage to box cars for shipment to various factories where it is used in the production of corrugated containers. When a car floor is loaded, additional rolls are lifted by these trucks to a second tier position, from which they are rolled into place in the car.

There also are two roll-handling trucks, each of 7,000 lb. capacity, for transporting large jumbo rolls from the machine to storage and from the machines or storage to the rewinding and cutting machines. Each of the rolls handled by these trucks is about 48 in.

Left—Arrangement of battery table for battery servicing. Right—Charging station with capacity for the continuous charging of 12 sets of batteries.

in diameter and 122 in. long and weighs about 5,000 lb.

A low-lift truck, assigned to the wet room of the pulp mill, completes the installation. This truck delivers the pulp in lap form to storage or to shipping or from storage to shipping. The laps are stacked on skids at the wet machine, where the truck gathers them and places empties.

All of these trucks are equipped with Exide-Ironclad Batteries of the TLM type. A total of 30 sets, including spares, make up the battery installation. Charging of these batteries is handled systematically in a well-designed charging station.

The charging station consists of two separate, fully automatic Electric Products Company charging units—one for eight and one for four batteries. These units are at one location where there is also a long roller top table on which the spare batteries are charged. The height of the table at various points conforms to the battery compartment floor of the trucks which also are of roller construction. A runway for trucks is provided next to the table.

When a truck comes in for a fresh battery, it is lined up with an empty space. The discharged battery is then easily pushed onto the table, from which a charged battery is supplied. Water is piped to the charging table and an outlet located over each battery for flushing.

Remote charging tables for the batteries used with the lap pulp truck and the large roll-handling trucks also have been installed. These tables are similar to the main charging plan, but current for them is supplied remotely from the main motor-generator sets. This arrangement eliminates the necessity of returning the large roll-handling, or lap pulp trucks to a distant point on another floor level for changing batteries.

A very simple, systematic schedule of charging is used for each truck, to coincide with each 8-hour shift, as follows:

	Battery No.		
	1	3	2
In Station	3 P.M.	11 P.M.	7 A.M.
On Charge	7 P.M.	3 A.M.	11 A.M.
Off Charge	3 A.M.	11 A.M.	7 P.M.
In Truck	7 A.M.	3 P.M.	11 P.M.

With this schedule, each battery has a 4-hour rest period before and after each 8-hour charge. Therefore, in the event of an emergency requiring a battery to work more than eight hours, it can do so with plenty of time still available for charging. A fully charged battery is also available in case one needs recharging before eight hours.

To guard against batteries running down, and the possibility of tow-ins, each truck is equipped with an Exide Discharge Indicator. This device signals the driver by means of a red light, to go in for a fresh battery, if full discharge is approaching.

In addition to the charging station for servicing the batteries, there is an auxiliary shop for making any adjustments or repairs to the trucks. This shop adjoins the charging station.

The results obtained with comparatively simple methods by the Union Bag organization in operating these ten electric trucks demonstrate that efficiency follows system and that savings follow efficiency.

FIBERS OF OLD ARABIC MANUSCRIPTS

INCLUDED in the Introduction to the Descriptive Catalog of the Garrett Collection of Arabic Manuscripts in the Princeton University Library, recently published, is a report of the National Bureau of Standards which gives the kinds of fibers found in the papers of 49 of the manuscripts.

The manuscripts tested were dated from the 11th to the 18th century, inclusive. With the exception of three manuscripts, the papers in about equal proportion are composed of ramie fibers and flax fibers. Ramie predominates largely in the manuscripts dated to the 14th century; flax predominates somewhat in the later manuscripts. The paper of one manuscript of the early 17th century is composed of Japanese mulberry fiber and the fiber of papers of two manuscripts of the 18th century is cotton.

The Bureau had previously reported the presence of ramie in a few very old papers, and its presence in so many of these Arabic manuscripts reveals that it was extensively used in the early days of papermaking. This appears to be an important contribution to the history of papermaking, for as far as the Bureau knows, there is no previous record of this. It is well known that linen was used in very early times, particularly by the Arabs. Ramie is very similar to linen in both its textile-making and papermaking properties and therefore has probably been generally classified in old papers as linen. Ramie is also known as rhea and China grass. It is said to be indigenous to India and probably also to China. It has been cultivated in China, Japan, Java, Borneo, Sumatra and the East Indies for a great many years. It is used abroad for the manufacture of textiles and still, to a small extent, for making paper. The use of cotton was begun apparently about the 7th century. The Bureau has found that the papers of some Chinese and Japanese manuscripts, dating as far back as the 6th century, are composed variously of paper mulberry, mitsumata, and bamboo fibers. Mulberry, mitsumata and other similar fibers are still used considerably in making the soft, strong tissues characteristic of those countries.

These papers, like the other oriental papers examined by the Bureau, exhibited little evidence of deterioration. Most of the papers of the Arabic manuscripts had an excellent glazed finish.

◆

CONVENTIONS AND COMING EVENTS

Feb. 20-22—National Paper Trade Association, Annual Convention, Waldorf-Astoria, New York City.

Feb. 20-23—Technical Association of the Pulp and Paper Industry, Annual Convention, Roosevelt Hotel, New York City.

Feb. 20-24—American Paper and Pulp Association, 62nd Annual Convention and Meeting, Waldorf-Astoria, New York City.

Feb. 21—Salesmen's Association of the Paper Industry, Annual Meeting and Luncheon, Waldorf-Astoria, New York City.

March 7-10 — American Management Association, Ninth Packaging Exposition, Hotel Astor, New York City.

April 17-19—First Annual Paper Festival, Savannah, Georgia.

June 11-14—Twenty-First Annual Convention and Buyers' Fair, National Paper Box Manufacturers' Association, Hotel Astor, New York City.

June 13-15—American Pulp and Paper Mill Superintendents Association, Wardman Park Hotel, Washington, D. C.

ALLIED

DU PONT TO USE IDLE MASS. MILL

Idle for two years, the Chapin & Gould Paper mill in Russell, Massachusetts, will soon be running full blast as a unit of E. I. duPont de Nemours & Company, Inc., which firm will transfer operations of its plant at Brattleboro, Vermont, to the Massachusetts site.

Since January 1936, the duPont company has operated the mill in Brattleboro as a large scale experimental plant to determine the commercial possibilities of Texon products. This latter substance is a rubber impregnated material used in various ways as a substitute for leather. The process was started by way of investigation by the Raybestos Manhattan Corporation in 1933 and the duPont organization became the licensee in 1936. The process of manufacture was set up following laboratory experiments as the mill was well adapted to experimental manufacture.

Operations, however, have been enlarged gradually and production has been hampered by overcrowding in addition to difficulties encountered by the pollution of the Wetshire brook in Brattleboro. The mill in Russell has a pure water supply and is close to the papermaking labor market of Holyoke.

◆

▸▸▸ DIVISION MANAGERS OF OAKITE PRODUCTS, INC., New York, New York, held a two-day conference recently at the company's headquarters office at which time new developments and improvements in cleaning methods, materials and equipments were discussed. Among other subjects discussed were the washing of felts and the cleaning of fourdrinier wires.

◆

ABRASIVE PLANT FOR AUSTRALIA

Supported by the keen interest of the Australian Government in the rapid expansion of the Australian metal working industry during the last few years, Australian industrialists have sought basic industries to round out their program and as a result, Australian interests have recently sought the co-operation of American and British grinding wheel manufacturers in forming a company to produce grinding wheels and allied abrasive and refractory products.

The new plant of Australian Abrasives Pty., Ltd., will be located on a four-acre tract in the industrial district of Sydney. Interested in this new project are the Carborundum Company, Niagara Falls, N. Y.; Norton Company, Worcester, Massachusetts; Universal Grinding Wheel Company, Ltd., Stafford, England, and William McPherson of McPherson's Pty., Ltd., Australia.

◆

G-E TO ERECT NEW BUILDING IN CHICAGO

The erection of a modern building involving an expenditure of $2,500,000, 20 per cent of which represents land investment, to house the Chicago headquarters of the General Electric Company has been announced recently. The site occupies the block bounded by South Canal, South Clinton, West Cabrini and West Arthington Streets.

Work will be started soon on the building which will provide space for the G-E Chicago sales offices, warehouse and service shop, the General Electric Supply Corporation, R. Cooper, Jr., Inc., and other associated interests. Holabird and Root, a Chicago firm, has been engaged to prepare plans.

The building site is adjacent to the tracks of the Chicago, Burlington and Quincy Railroad and company officials believe that it will permit General Electric and its associates to continue and improve service to the electrical interests in the Middle West.

◆

HAERING ENLARGES ITS FACILITIES FOR PRODUCTION

The production facilities of D. W. Haering & Company, manufacturers of water conditioning chemicals and proportioning machines, are to be moved to new and larger quarters at 2308 S. Winchester Street, Chicago, on February 15. Production facilities and the control laboratory will be located in the new building while executive offices and research laboratories will be continued at 3408 Monroe Street, Chicago.

D. W. Haering & Company was organized in 1931 as the original firm of organic chemists serving the scale and corrosion control fields. Starting with the introduction of beta glucoside, continued research by the company resulted in the present standard production of forty-five formulae of glucoside derivatives in addition to the production of a wide variety of proportioning machines employing the Haering Fluid Piston Principle.

◆

NEW PRODUCTS ANNOUNCED BY U. S. RUBBER

Improved conveyor belt construction, embodying a feature designed to withstand unusually severe service conditions, has been announced by the Mechanical Goods Division of the United States Rubber Company. The refinement is accomplished by imbedding a special weave breaker-strip fabric in a heavy layer of soft white gum. This layer is inserted next to the belt carcass as an integral part of the belt cover and provides a shock-absorbing cushion for the belt cover.

In addition, the U. S. Rubber Company has announced a newly-designed U. S. Super Royal Cord Air Hose to meet severe service demands. The hose, which employs the use of a high grade synthetic rubber tube, is highly recommended for mining work and hot oil conditions.

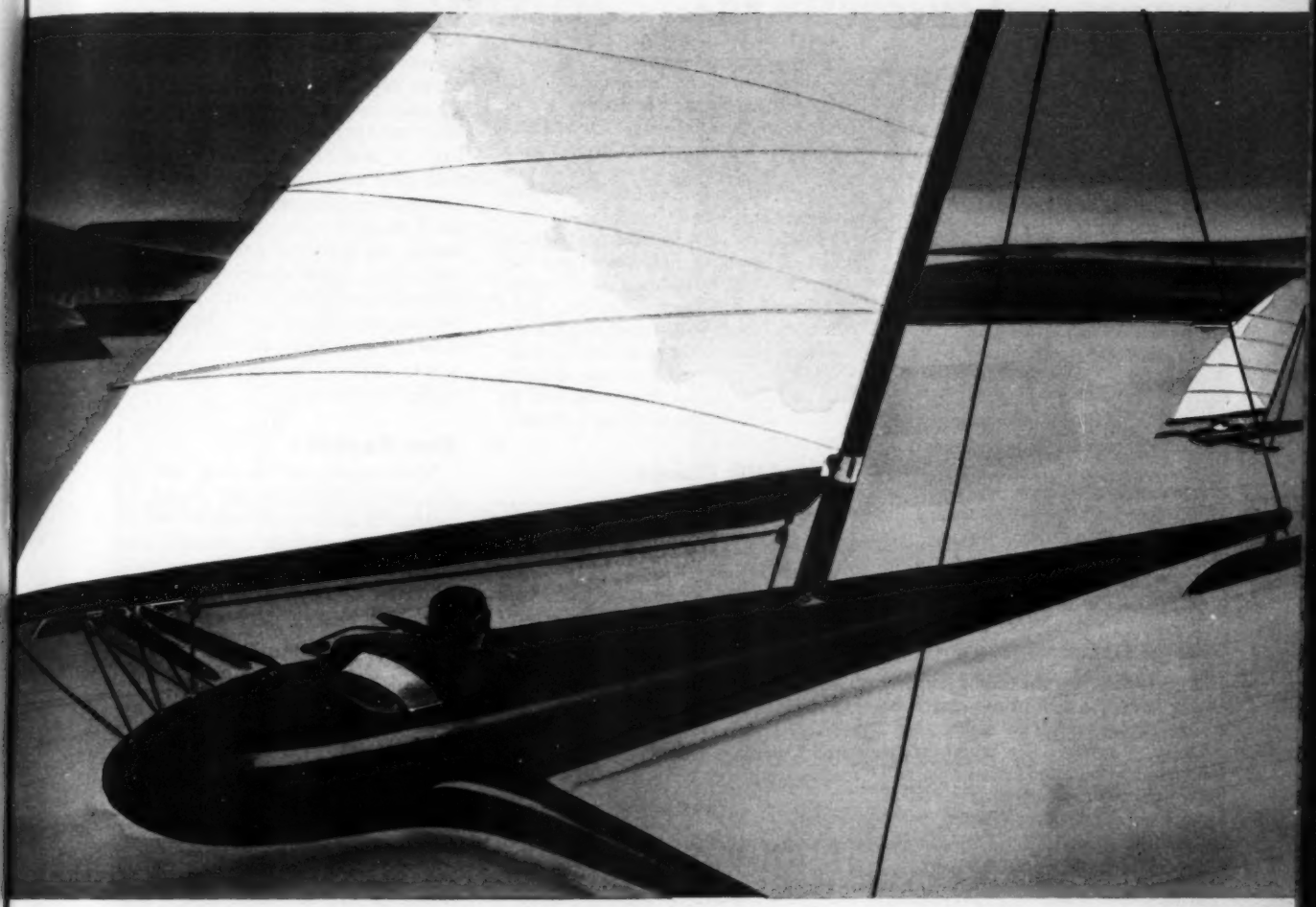
◆

ALLIS-CHALMERS SELLS GENERATOR TO HUMMEL-ROSS

A contract, totaling nearly $90,000 and covering a 3,000 kilowatt high pressure non-condensing automatic extraction turbo-generator, was awarded to the Allis-Chalmers Manufacturing Company by the Hummel-Ross Fibre Corporation of Hopewell, Virginia. The turbo-generator has a direct connected exciter and generator air cooler.

This purchase makes the fourth steam turbine furnished by the Milwaukee equipment firm to the Hopewell plant of the large kraft paper manufacturing company—the earlier units having been rated 500 kw., 750 kw. and 3,500 kw. respectively. The new unit will furnish additional power to the paper mill and will supply extraction steam for process work.

ACCURACY



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ALKALI

OTHER COUNTRIES

AUSTRALIAN MILLS

Burnie Mill

In Operation

The Associated Pulp and Paper Mills, Ltd., mill at Burnie, Tasmania, began production the middle part of December of machine-finished printing paper made entirely from Australian eucalyptus pulp. A cream wove writing paper was also produced from 100 per cent eucalyptus pulp. These papers are reputedly the first papers in the world to be commercially manufactured entirely from eucalyptus wood pulp.

The whole of the Burnie mill is now in operation. The electrolytic plant for the manufacture of caustic soda and chlorine started up during the early part of December and the various sections of the pulp mill proper were brought into operation in sequence. The papers produced by the Tasmanian mill have been pronounced by experts to have the characteristics normally associated only with papers carrying a high percentage of esparto grass pulp.

Mill at Hobart

Construction is proceeding rapidly on the new mill now being erected by Australian Newsprint Mills Pty., Ltd., at Hobart, Tasmania. The wharf is now complete and all major excavation and backfilling has been done. The mill is located on the Derwent River.

Sulphite Mill

Australian Paper Manufacturers, Ltd., is proceeding speedily in the erection of its new mill at Maryvale, Gippsland (near Melbourne) and operation should start around June 1. Although the plant has been designed for a capacity of 100 tons of pulp per day the output will be limited at the outset to 50 tons per day inasmuch as only one of the two Kamyr feltless wet machines has been delivered.

It is reported that the 200-inch paper machine which has been ordered from Walmsleys (Bury) Ltd., England, will not be in operation before the end of 1939 although some of the dryers have already arrived.

The woodroom of the new plant is of conventional design and contains a Sumner chipper and chip screen with a chip breaker by Karlstad's. The causticizing department is equipped with a Dorr clarifier, pumps, etc., and an Oliver filter. The lime is reburnt in a 12-foot by 6-foot rotary lime kiln fired with producers gas from brown coal briquette producer.

Three digesters, manufactured by Babcock & Wilcox (Scotland) are of 2,000 cubic feet capacity. The washing system is counter-current Oliver-Young layout using two 8-foot by 8-foot Oliver-Young vacuum filters. Trimbey knotters and screens are installed.

In the recovery section one 6-body, 5-effect Swenson film evaporator has been installed in addition to a Tomlinson recovery furnace. The flue gases from the latter will pass through a dry Cottrell precipitator to the smoke stack.

It is not expected that more than 60 per cent eucalyptus fiber pulp will be used in most of the company's product.

New Mill Rumor

The manufacture of transparent wrappings in Australia will be undertaken by a company which will probably be organized in the near future, according to a recent statement issued to the press by the acting chairman of Australian Paper Manufacturers, Ltd. It has been reported that the project will be backed by British and Australian capital. It is also reported that a secret process will be used to make the wrappings from cotton linters and other substances.

◆

ENGLISH NOTES

1939 Forecast

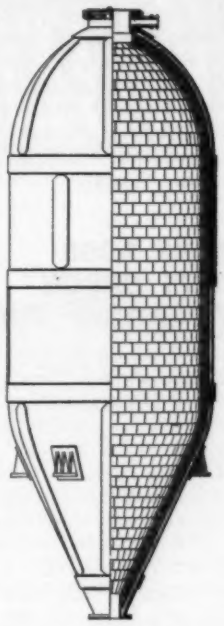
The British paper trade has reached the anomalous position of costly production at a period when the quoted prices for materials are fairly low. Actually the latter is due to the former. When the cry was raised, in 1937, that papermaking materials would become scarce, the majority of the mills gave prior attention to the purchasing of an adequate supply of materials sufficient to last them one or two years. The question of price took a second place. Consequently, buyers of materials during 1938 have been more or less absent and despite the Scandinavians curtailing production of pulp, the prices have steadily declined.

Printers and other paper purchasers, noting these low prices for materials, have expected a steep fall in paper prices but now that they are gradually realizing the position of the papermakers, this optimism is receding. The paper trade leaders are not anticipating any rapid fall in prices, at least for the early part of this year, and if trade shows any real signs of stabilizing on a higher basis than at present, there is the remote possibility of prices hardening. It would seem that the printer and other paper purchasers will have to accustom themselves to a higher level of prices than those in effect during the slump of 1931-36, for not only is the papermaker operating on materials purchased at high levels but his incidental materials—clay, starch, coloring and coal—are much higher and in addition, there is a tendency for wages to advance.

New Papers

There appears to be many new papers on the British market. Bruce, the famous Scottish mill, noted for its bulky featherweight antiques, has turned its attention to producing bulky imitation arts giving 10-15 per cent more bulk than the standard, thus offering considerable economy. Their initial sample carries 175 screen blocks. John Galloway, who has never produced coated papers before, has entered the market with an esparto body process coated paper, and the Cutler Mills, already noted for real arts, have produced Silcote, another process quality on esparto body. So far Cutlers appear to have presented the finest process quality and the nearest approach to the real coated art. Meanwhile this same mill has also entered the field of better class bonds with a medium priced quality, watermarked to register.

The position in regard to the future of prices is still hazy. While it is announced that wrapping papers will be maintained at present levels, M. G. poster papers have declined £3-10-0 per ton. In some quarters it is believed that pure wood grades should be down by £2-6-8 per ton and other esparto grades brought into line with these. In other quarters, it is felt that there is little chance of alteration. Hitherto, it has been obvious that any reduction in price will not affect sales, but the recent demonstration of a lack of heavy stocks, and the fact that the M. G. poster reduction has produced more business, might influence the approach to prices.



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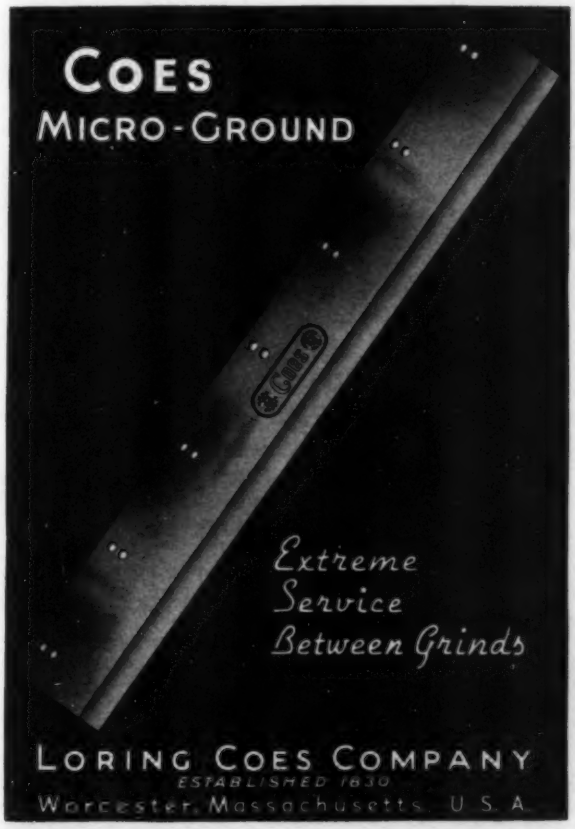

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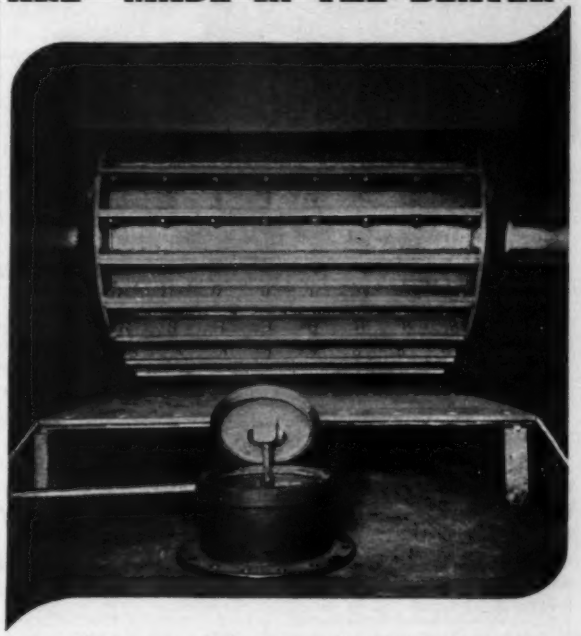
. . . LIKE PAPER ARE "MADE IN THE BEATER"



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This metal helps decidedly to get the results your care and skill deserve. Paper stock damage caused by corrosion can now be a worry of the past, and rust a stranger. Chemicals used in pulp and paper production have virtually no effect on Armco Stainless Steel. It is strong and abrasion resistant. Equipment lasts longer and costs less to maintain.

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ITALIAN NEWS

Cellulose Production

Some interesting figures relative to Italian cellulose production were released lately.

The 1934 production was 8,200 tons against an importation of nearly 200,000 tons. During the first seven months of 1938 home production was 41,600 tons and importations totaled 112,800 tons. By 1941, if Italy's domestic production increases at the same relative rate, there will be an importation of only 55,000 tons. Cellulose plants in course of erection and including those proposed, represent a productive capacity of about 130,000 tons.

Paper-Paperboard

Although there was a reduction of 6.29 per cent in the production of paper and paperboard in Italy during the first eight months of 1938 it was made known that Italy's exports of these products exceeded the imports by approximately 2,900,000 lire or about $152,631. At the end of July, 1938, Italian paper mills totaled 225 which employed 30,828 workers.

Plant Expansions

Italy has authorized several plants to enlarge or install new equipment for the production of cellulose. These include: Societa per la Fabbricazione della Pasta di Legno, Padua; S. A. cellulosa d'Italia, Rome; Societa per Sviluppo della Produzione della Cellulosa, Rome; S. A. Cartiere Burgo, Turin; Soc. in Accomandita L. de Medici e C. of Cirie, Turin; Cartiera Silvana Giocomalli, Florence, and S. A. Beniamino Donzelli, Milan.

Transparent Paper

The transparent paper industry has developed rapidly in Italy and although not initiated until 1931 has progressed to a point where, according to reports, it produces sufficient for national needs. Transparent paper is used extensively in the Italian candy industry. It is also used to a large extent by the straw hat industry of Florence.

Poplar Trees

Much attention has been given the cultivation of the poplar tree in Italy recently due to the fact that its wood is used to a great extent in the production of cellulose and mechanical wood pulp. The Milan Forest Committee has created a successful cultivation of the species at Pietrasanta where over 100,000 were planted in 1938 from branches of adult poplar trees. Regular seedlings were also planted at this nursery.

▶▶▶ BARRANQUILLA, COLOMBIA, IS THE SITE OF A NEW PAPER MILL which started production recently. The plant has an annual capacity of 15 metric tons per 24-hour day and is equipped to turn out both paper and board although only wrapping paper will be manufactured at present. The company will use imported pulp from Norway.

◆

TERRITORY LOSS AFFECTS CZECH NEWSPRINT IND.

The recent territorial adjustment of Czechoslovakia has affected that country's newsprint industry severely. The installed capacity of newsprint mills within the confines of the former Czechoslovakia was 60,000 metric tons. Now it is estimated that capacity for production is only 12,000 tons in the reduced territory. If these estimates are correct it is altogether possible that the country will have a shortage of 15,000 to 18,000 metric tons of newsprint per annum. This shortage may, of course, be covered by imports from Germany.

◆

▶▶▶ JAPAN'S DRIVE FOR SELF-SUFFICIENCY IN PULP has resulted in a proposal that a new rayon pulp mill be built by the Kokusaka Pulp Kaisha (National Pulp Industry Company), it was reported recently. Production in the Empire is expected to reach 490,000 tons by 1941.

◆

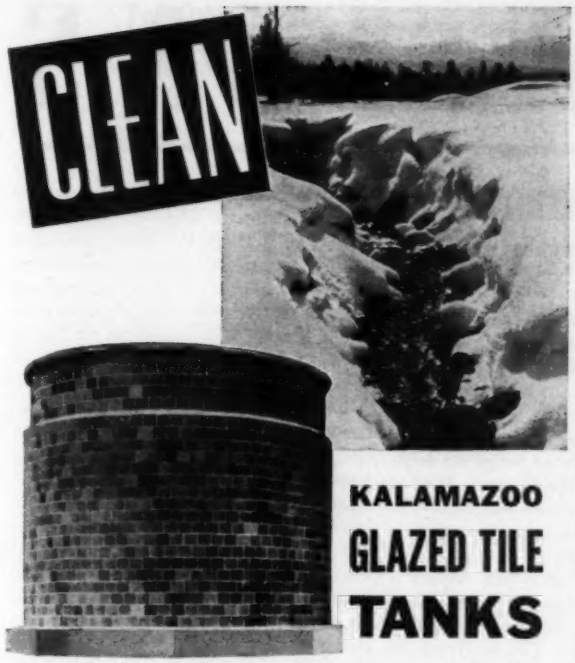
▶▶▶ TRANSVAAL, SOUTH AFRICA, is the site of a new paper mill which is being built, it is reported, at a cost of $1,250,000. The mill, now spoken of as "South Africa's largest paper factory," will use 60,000 tons of home-produced papermaking materials annually.

◆

POLAND BUILDS CELLULOSE MILLS

It has been reported that efforts are now being made in Poland to render the country independent of imports of cellulose for the manufacture of paper and artificial silk.

A large cellulose plant is now being established in the Grodno district and this mill will be ready by 1940. Last year production began at the new mill in Niedomice and only recently it was reported that the leading papermaking concern of Steinhagen & Sanger is to build a cellulose mill with a capacity of 200,000 tons per year. This mill is scheduled to be in operation by the fall of 1939.



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ASSOCIATIONS

CANADIAN TECHNICAL MEN HOLD ANNUAL MEETING

DUE to the many discussions covering pulp and papermaking, as well as wood conservation, forestry and engineering, the annual meeting of the Technical Section of the Canadian Pulp and Paper Association, held at the Mount Royal Hotel, Montreal, January 25-27, was considered by most as one of the most successful ever held by the organization. The Section itself has had a very successful year, the total membership having been increased by 25 to 311.

According to the Section Chairman's report, much valuable educational work has been accomplished by committees in the Section. Arrangements have been completed whereby the Section will pay the traveling expenses of a limited number of speakers from the staff of the Research Institute for the purpose of addressing interested groups of men in the industry residing at a considerable distance from Montreal. A translator has been engaged, and foreign abstracts have been rewritten and sent out to members requesting this service.

Much interesting work has been accomplished, or is now in progress, by other committees in the Section. The Industrial Wastes group is now studying non-fibrous wastes associated with sulphite mill operation. It was decided that the first step in this line would be an up-to-date survey of what has been done in the way of studying and recovering these losses. The Engineering committee has confined itself, more or less, to a detailed study of feedwater conditioning, a continuation of the project started last year. Optical properties of paper were studied largely by the Physical and Chemical Standards committee, and at the meeting tests carried out by William C. Lodge were discussed by members.

D. C. Everest, president of the American Paper and Pulp Association, who was to have been the guest speaker at the joint luncheon of the Technical and Woodlands sections, found it impossible to attend, and in his absence, J. O. Wilson, retiring chairman of the Woodlands Section, and T. A. McElhanney, superintendent of the Forest Products Laboratories of Canada, were called upon to comment upon the joint committee's program.

The Technical Section elected the following new officers for 1939: chairman, E. M. Little, Anglo-Canadian Pulp and Paper Mills, Quebec; councillor (elected for one year), J. C. Nutter, Robert Gair Company, Montreal; councillors (elected for three years), E. B. Hyndman, Anglo-Canadian Pulp and Paper Mills, Quebec, and Harry S. Spencer, Howard Smith Paper Mills, Beauharnois, Quebec.

R. A. McInnis, president of the Association, was re-elected for the fourth consecutive term.

◆

CHEMISTRY GROUPS HOLD JOINT MEET

An interesting joint meeting of the American Section of the Society of Chemical Industry and the American Chemical Society was held February 10 at The Chemists Club in New York City. Dr. Wallace P. Cohoe, chairman of the American Section, presided at the meeting and Dr. Wanda K. Farr, director of the cellulose laboratory of the Chemical Foundation at Boyce Thompson Institute, was the main speaker.

Dr. Farr's talk on "Viscose Rayons" covered microscopic, X-ray diffraction and chemical studies of developing wood fibers; the effect of purification treatments of wood pulp, and the behavior of the purified product in various stages of viscose manufacture. Dr. Farr also discussed the historical and botanical background of the modern rayon industry, emphasizing the fact that not only chemistry but botany are the fields for study of essential features of viscose rayon.

◆

TAPPI GIVES $1,000 AID TO RESEARCH WORK

A grant of $1,000 has been given the New York State College of Forestry at Syracuse, New York, by the Technical Association of the Pulp and Paper Industry for the support of research on "The Relation of Lignin Content to the Strength of Paper and Pressed Boards."

This project will be carried out on a graduate basis under the direction of Professor E. C. Jahn. A TAPPI Fellow has been selected and is now at work at the college. He is C. V. Holmberg, a graduate of Michigan State College, who did graduate work last year in pulp and paper chemistry at the University of Idaho with Professor Jahn. Professor Jahn was formerly associated with the Western school before resigning and becoming a member of the New York State College of Forestry faculty.

TAPPI, through its Committee on Fundamental Research, lends financial assistance for research on approved problems fundamental to the pulp and paper industry. In this way research is promoted and helped at selected institutions. The new pulp and paper laboratory at the New York college (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 1061, Jan. 1939) and its modern equipment affords excellent facilities for carrying on investigations in the manufacture of pulp and paper.

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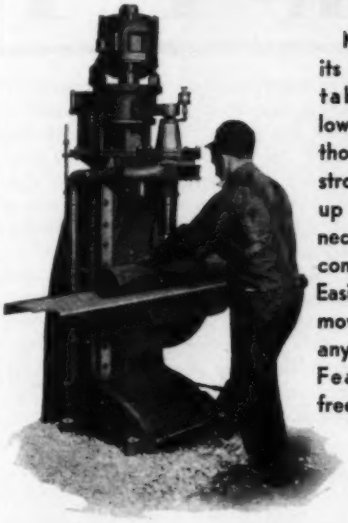

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SAFETY

NEPCO WORKERS WIN PRIZES FOR SAFETY EFFORTS

One thousand dollars in prize money was distributed the first of February by the Nekoosa-Edwards Paper Company to employees of its mills in Port Edwards and Nekoosa, Wisconsin, following the close of a safety contest which ended December 31, 1938.

At the beginning of last year, a dollar was set aside for every employee in each department throughout the entire organization. Any department having one accident was penalized 25 cents per person, departments having two accidents were penalized 50 cents and any department having more than two accidents lost their entire share of the prize money. This penalty money was put into a jackpot and was distributed along with the original sum among those departments not having any accidents.

As a result of the contest, each man in the company's finishing room, Alexander machine and beater rooms, pulp mill and power house received $1.40.

GLATFELTER AWARDS CASH FOR SAFETY

For having completed a five-year record of no lost-time accidents, employees of the boiler house, box making shop and pipe fitting departments of the P. H. Glatfelter Company, Spring Grove, Pennsylvania, recently received a cash award from the company.

At the time of the presentation of the awards, the employees were notified of the company's 1939 safety contest. A cash award drawing will be conducted quarterly with all employees participating in the groups having no lost-time accidents. If any of the employees of any one group should suffer a lost-time accident, the entire group will be eliminated from the drawing for that particular quarter. There will also be a year-end cash award for all departments, regardless of their group record, who have had a no lost-time accident record for the entire year.

The Paper Industry Safety Contest

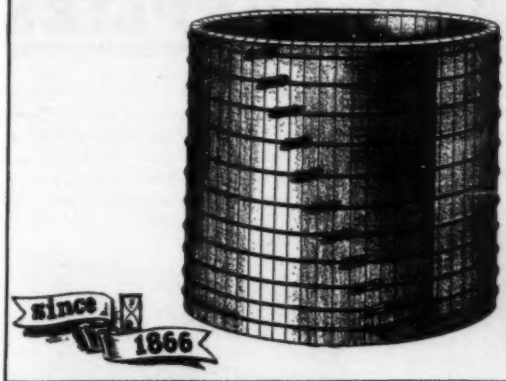
July 1, 1938 to June 30, 1939

Out of 163 mills reporting for December, 22 have perfect record

PERFECT SCORES
Division I—Pulp and Paper Mills

PARTICIPANT	MILL	LOCATION
GROUP A		
GROUP B		
Consolidated Paper Corp., Ltd.*	Belgo, Shawinigan Falls	Canada
Southern Kraft Corp.	Continental Division	Marinette, Wis.
GROUP C		
GROUP D		
Bird and Son, Inc.	Phillipsdale	Rhode Island
The Mead Corporation	Sylva Paperboard Co.	Sylva, N. C.
The Mead Corporation	The Harriman Company	Harriman, Tenn.
Spaulding Fibre Co., Inc.	Milton	New Hampshire
United States Gypsum Co.	North Kansas City	Missouri
American Writing Paper Corp.	Mt. Tom Division	Holyoke, Mass.
Hollingsworth & Whitney Co.	Arcostook & Cobbossee	Gardiner, Me.
Rogers Fibre Co., Inc.	Fibreboard Mill-Div. I	Bar Mills, Me.
The Mead Corporation	Nashville	Tennessee
Central Fibre Products Co.	Vincennes	Indiana
Central Fibre Products Co.	Mt. Carmel	Illinois
Hollingsworth & Whitney Co.	Abenaquis Mill	Madison, Me.
Spaulding Fibre Co., Inc.	Hayes Plant	N. Rochester, N. Y.
Division II—Paper and Board Re-Manufacturing		
Fort Orange Paper Company	Paper Box Plant	Castleton on Hudson
Bird and Son, Inc.	Chicago	Illinois
The Container Company	Van Wert	Ohio
Gaylord Container Corp.	Dallas	Texas
Bird and Son, Inc.	Shreveport	Louisiana
Gaylord Container Corp.	Houston	Texas
Bay West Paper Company	Green Bay	Wisconsin

*December report delayed.



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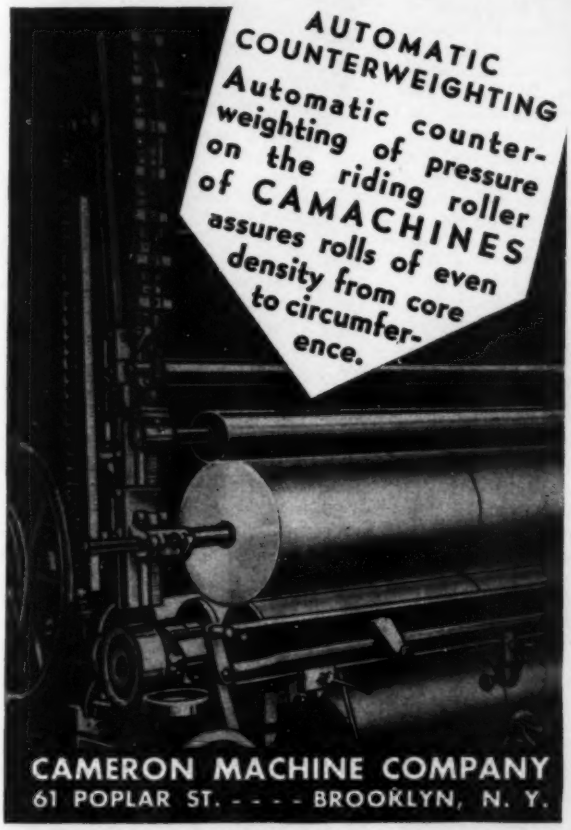
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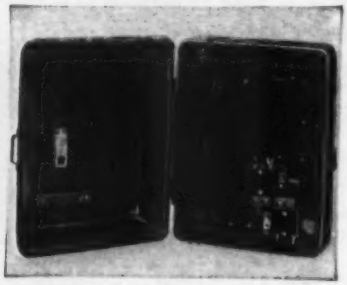
NEW EQUIPMENT AND SUPPLIES

Indoor Circuit Breakers

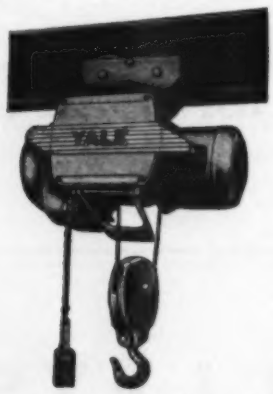
Indoor circuit breakers for both industrial plant and central station use and in ratings up to 15,000 volts have been announced by Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. These circuit breakers, designated as Type U De-ion air circuit breakers, operate without oil or liquid;



function in normal atmosphere, and are not dependent upon maintenance of any medium such as air, pressure or a vacuum. High speed arc control, arc resisting contacts, solenoid operation, universal mounting arrangements, and improved mechanical construction, according to the manufacturer, assure low operating costs.

Wire Rope Electric Hoist

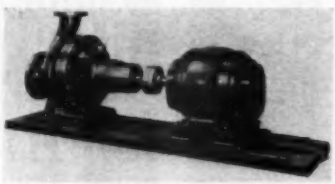
A wire rope electric hoist that is built in capacities of ¼ to 6 tons and that is air-cooled has been developed by The Yale & Towne Mfg. Company, Philadelphia, Division, Philadelphia. In this design of hoist, which is designated as the Cable King, the entire train of gears and the load brake assembly are totally enclosed in an oil tight housing; the main hoist frame is



a heavy one piece ribbed steel casting; drive shafts, gears and pinions are chrome nickel steel forgings, heat-treated, hardened, and ground; motor is either a-c. or d-c. and of the totally enclosed, ball bearing type; control equipment is either pendant cord (manual) or push button; load brake is Weston screw and disc type, self actuating; motor brake is external contracting drum type; safety limit stop prevents overtravel of hook; cable drum is a heavy casting with machine cut grooves protected from weather and guarded against mechanical abuse by enclosure in hoist frame; bottom block is enclosed safety type; and load hook is mounted on sealed ball thrust bearing. The hoist is furnished for hook or lug suspension, plain or hand geared eye-beam trolley suspension, special monorail systems, motor trolley suspension, and floor mounting.

Centrifugal Pump for Paper Mill Service

A single suction open vane impeller centrifugal pump, known as type PO and especially designed for handling paper stock of various consistencies, paper mill liquors, etc., has been introduced by the Centrifugal Pump Division, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin. The pump is designed to permit withdrawal of the complete rotating element from the casing without disturbing the suction and discharge piping connections, or the alignment of the pump and motor which are mounted on a common base. On the motor side of the pump casing, and cast integral with



it, is a vertical flanged opening large enough for the runner to go through. Rigidly bolted to this flange, and overhanging from it, is a conically shaped cast iron bearing housing containing two anti-friction bearings that support the pump shaft and its overhanging runner. The motor is mounted on an adjustable sliding sub-base. To remove the complete rotating element, the motor can be drawn away from the pump a distance of about seven inches, which allows ample clearance to withdraw the runner and shaft with the bearing housing without disturbing any of the pump connections.

Paraffin Wax Emulsifier

A new paraffin wax emulsifier, designated as Nopco 2251, has been developed by the National Oil Products Co., Harrison, New Jersey. This emulsifier, according to the manufacturer, allows for greater flexibility in use since the emulsion can be prepared in varying concentrations of solids.

Fluorescent Lamp Diffuser Units

A new line of lighting units designed to utilize the characteristics of fluorescent lamps has been placed on the market by the Benjamin Electric Mfg. Company, Des Plaines, Illinois. These units, known as "Daylight" Fluorescent Lamp Diffusers, are made in two sizes—a 36-in. size and an 18-in. size. Each unit is arranged for three lamps. The 36-in. size uses 30-watt lamps providing 36 lumens per watt; the 18-in. size, 15-watt lamps rated 30 lumens per watt. Auxiliaries necessary for the operation of these lamps on standard lighting circuits are built into the units. The 18-in.

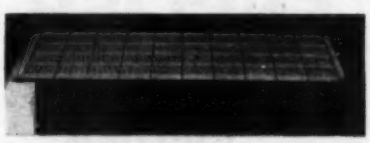
units operate on a line voltage of 110-120, 60 cycles a-c.; while the 36-in. units can be supplied for either 110-120 volts, 60 cycles a-c. or 208-230 volts, 60 cycles a-c., as desired. The reflector of each unit is of polished Alzak aluminum with individual troughs for each of the three lamps. The housing for the reflector is of gray porcelain enamel. Auxiliaries have ample leads for attaching to sockets and line leads. Units have a cast iron suspension fitting tapped ½ in. standard.

Welding Electrode For High Tensile Steel

The Lincoln Electric Company, Cleveland, Ohio, has announced the development of a welding electrode for arc welding steel with a tensile strength of 70,000-80,000 lb. per sq. in. in the construction of pressure vessels. Special features of this electrode, as pointed out by the manufacturer, include: Less spatter loss, high deposition rate, easily removable slag formation, well shaped beads, and weld deposits having minimum porosity. The electrode is made in 18 in. lengths and in 3/16 in. and ¼ in. sizes.

Stainless Steel Screen Plate

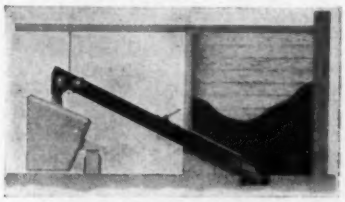
A screen plate manufactured by Wm. A. Hardy & Sons Co., Fitchburg, Mass., from Enduro 18-8 FM stainless steel, a product of Republic Steel Corporation, Cleveland, Ohio, has been announced. This plate is of 16 gauge material; and slots, varying from .050 in. down to .008 in., can be cut



in it. Among the advantages listed by the manufacturer for the plate are: great reduction in stringing, faster and freer screening, cutting of cleaning costs, and long service against slot wear or breakage on rotary screens.

Stoker Hopper Loader

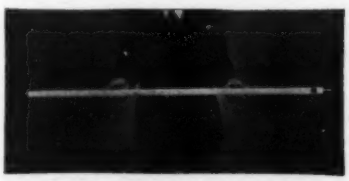
D. J. Murray Mfg. Co., Wausau, Wis., has added an automatic loader for stoker hoppers to its line of machinery items. This loader, designed for a capacity up to 10



tons of coal per hour, may be suspended from the ceiling or supported by a stand from the floor. It can be furnished for right or left hand operation; and is equipped with a 1½ hp. motor.

100-Watt Fluorescent Lamp

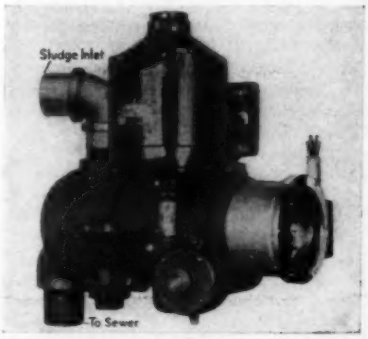
The General Electric Vapor Lamp Company, Hoboken, New Jersey, has developed a 100-watt fluorescent lamp, a tubular light source with an effective length of 4 ft.



A fluorescent coating inside the tube converts ultra-violet radiations produced in the tube to visible light. The efficiency of the lamp is 50 lumens per watt. The lamp is suggested by the manufacturer for application in industry where high illumination levels are required.

Desludging Valve

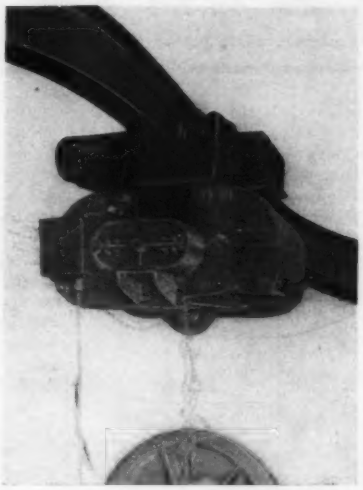
The Permutit Company, 330 West 42d Street, New York City, has developed an



automatic desludging valve which permits the flow of sludge from a container by gravity or under pressure. The valve is motor operated and of simple construction.

Motor Trolley for Hoist

American Engineering Company, Philadelphia, has announced the development of a motor trolley for application to any Class "B" Lo-Head hoist of the bolt suspension, plain trolley, or hand-geared trolley type. Among the features cited for the trolley by the manufacturer, the trolley being designated as Type "RB," are: short wheelbase, low headroom, four-wheel drive, and balance. Specifications include heavy duty Hyatt roller bearings for all trolley wheel and gear shaft bearings; cut gears; cast steel trolley wheels with machined



rolling surfaces; ball bearing motor, fully enclosed and designed especially for hoist service; and a controller of the drum type, fireproof, and completely protected from dirt and moisture. The controller is operated by pendant cords. Special controls are available.

Shin Protector

Ellwood Safety Appliance Co., Ellwood City, Pennsylvania, has announced a shin protector which, it is claimed, can be worn with absolute comfort either outside or in-

side apparel. Each guard is made of fiber formed to the contour of the human leg. A molded sponge rubber pad is used at the top and bottom of each guard between the inside of the guard and the wearer's clothing.

Expansion Joint for Concrete Construction

The Celotex Corporation, Chicago, Ill., has announced an expansion joint for use in protecting concrete construction. This joint, known as Flexcell, is made from cane fibers which are felted into a cellular board and saturated with a special asphaltic compound. The manufacturer recommends the use of this joint in such concrete slab construction as platforms, driveways, sidewalks and floors; and states that it will compress without extruding when the concrete expands, and will recover its original size and position when the concrete contracts.

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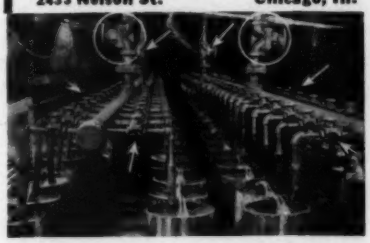
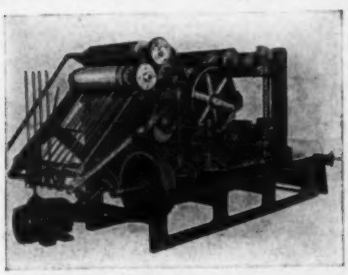


Rotary Printing Press

A 2-color rotary printing press, designed for printing paper in roll form and delivering it either in sheets or in rolls, has been



announced by Paper Converting Machine Company, Green Bay, Wisconsin. This press is of the letterpress type, and is designed to print paper ranging in weight from lightweight tissue up to the heaviest weight kraft, bond or book. It is equipped with a Horton clutch for easy starting.

TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

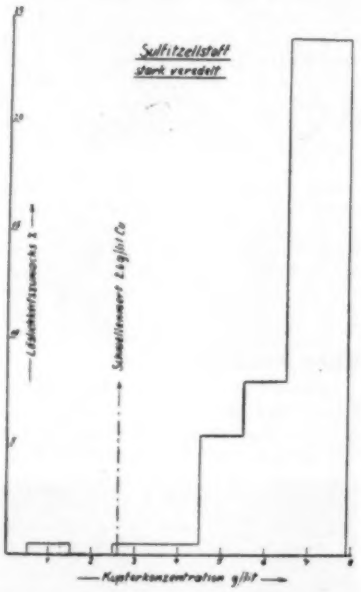
Contribution to the Constitution of Lignin

The question is asked: "Are piperonyl groups present in lignin?" The present author finds (in common with Hibbert and his co-workers at McGill University) that by applying tests for formaldehyde to lignin derivatives which had been treated with acid, negative or practically negative results were always obtained. (The test consisted in converting the HCHO into formaldimedone). No. CO_2 was formed. These tests indicate that piperonyl groups are absent in both nitrolignin and in the original lignin. Control experiments, whereby conditions simulating the isolation of nitrolignin were made with piperonal itself, show that only 0.04 per cent HCHO was obtained after a 90 minute treatment of 2 g. piperonal, and 1.5 g. urea, with 30 cc. alcohol, and 8 cc. (1.4) HNO_3. Karl Kürschner. Papier-Fabr. 36 (Tech-Wiss. Tl.) 446-8 (1938).

Fractionation of Pulps In Cuprammonium Solution

Through a gradual increase of the copper content of a cuprammonium solution, it is possible to attain regions of solubility varying from nearly complete insolubility of cellulose, to complete peptization. Chemical and colloidal studies of this stepwise fractionation indicates that a certain optimal concentration threshhold which, on the one hand, separates cellulose from non-cellulose polysaccharides and which (on the colloidal side) causes a separation of smaller particles from the larger ones. The solubility of a cellulose in cuoxam (i.e., cuprammonium) varies according to its origin and pretreatment. The author has drawn various solubility diagrams in which the percentage increase in solubility has been plotted against copper concentration in g/liter. Only one of these (13 diagrams) is produced herewith. The figure shows the solubility diagram of a highly purified spruce pulp. In the figure, the so-called Schwellenwert (threshhold) of 2.6 g/liter of copper gives the figure below which only non-cellulosic polysaccharides, or cellulose degradation productions of small magnitude are removed. In the case shown in the figure the minimum copper concentration in which the cellulose is completely peptized is 7.9 grams per liter. Similarly, tabulated data and, in some instances, diagrams are given for bleached, unbleached and partially purified sulphite, bleached, unbleached and purified pine sulphate pulp, bleached beech pulp, poplar pulp, straw pulp, various forms of linters and viscose made from bleached spruce sulphite.

Closer approximations of the composition of the pulp (and its evaluation) are thus rendered possible. The data lead to the concepts of the so-called Flächenwert (surface value) and the cellulose number (Cellulosezahl). The former may be expressed numerically by multiplying the increase in solubility (see the figure) by the copper concentration for each rectangle of the diagram, and then adding together these areas. The per cent of areas (in the diagrams) on the right of the "threshold" of 2.6 g/l. represents the so-called cellulose number. (The threshhold varies depending on pretreatment). This number is ordinarily higher than the per cent alpha cellulose, although in highly purified samples of cellulose the two figures are nearly the same. For example, in the case of thoroughly purified spruce sulphite (used in obtaining the diagram of the figure) the values are 99.4 and 97.8 respectively. In only partially purified material (especially poplar pulp and viscose), the cellulose number may be much higher than the per cent alpha cellulose. The former represents a mixture of cellulose chains, some of which are smaller than those found in alpha cellulose.



Tabulated data give complete analyses of the pulps examined, their percentage solubility at various copper concentrations, the constants described above, the minimal concentration of copper in g/l for complete solution and the solvation ratio of Cu/C_6. The surface value (Flächenwert) serves to give numerical expression to the mean particle size of the cellulosic residue (remaining after the copper threshhold has been reached). The greatest surface value was found in the case of a highly purified spruce sulphite (708). This was even considerably higher than the value found for linters (550). Bleached sulphite pulps (whether from spruce, pine, poplar or beech) when not subjected to further purification, gave similar surface values (332-384). Strangely enough, a viscose sample prepared from a bleached sulphite (339) gave only a slightly higher surface value (355), indicating that spinning had not changed the mean miceller structure. For details, the original paper must be consulted. W. Kumichel. Papier-Fabr. 36 (Tech-Wiss Tl) 497-508 (1938).

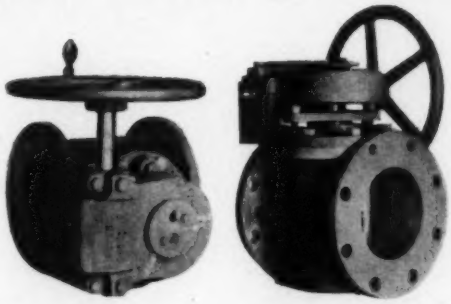
Characterization of Pulps By Viscosimetric Methods

In industry, viscosimetric methods require the use of definite amounts of pulp in cuprammonium solution. According to the official German technique, 1.25 per cent sols are used, or if the falling sphere method is employed, the concentrations are even higher. In certain mills, 1 per cent solutions are used in control work. These technical control methods often lead to a very faulty picture of the real relationship between viscosity and strength, since it is ordinarily assumed that marked changes in viscosity are definitely correlated with changes in strength. Often, however, there are great viscosity differences between different pulps without any appreciable change in the strength of paper, artificial fibers, or films prepared from such pulps. The opposite effect is also noted at times.

The author points out that the viscosity of polymeric homologous celluloses in higher concentrations does not change *proportionally*, but *functionally* with the degree of polymerization (D.P.) Only in the range of sols (i. e., in low concentrations) is the specific viscosity proportional to the concentration. With colloids of high D.P. the viscosity increase with rising concentration is much sharper than with colloids of low D.P. Data are given using commercial pulps, which clearly substantiate this assumption. For example, (using 1 per cent cuprammonium sols for viscosity measurements) a spruce (special) sulphite pulp with a viscosity of 157 showed a D.P. of 1585; another with a viscosity of only 45 showed a D.P. of 1075. When a highly degraded pulp, viscosity 2.6, was examined, this still showed a D.P. of 145. Using the T.A.P.P.I. standard procedure, with an entire series of pulps, it was again shown that the viscosity changed much more rapidly than did D.P.

These data serve to show that commercial control viscosimetric methods are completely unsuited to evaluation of pulps with high D.P. Furthermore, these same technical control methods (where the concentration is kept constant) may give very different viscosities with pulps that give nearly identical strength tests. By using chemical means of modifying cellulose, either by acid or by the use of oxidizing agents, a decrease of D.P. from 2000 down to 1000 causes no appreciable change in fiber strength. This was shown by Clibbens

Record 2-way (2 Port) Flanged Pulp and Paper Stock Valves



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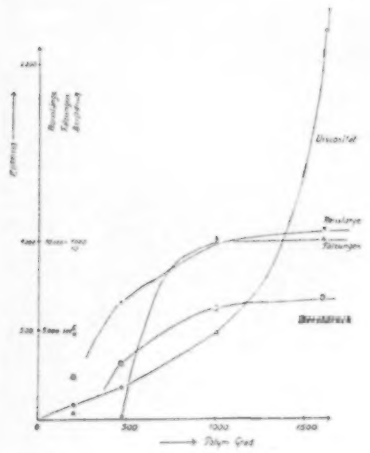
and Ridge, who used concentrations of 0.5 per cent cellulose in Schweizer's reagent. With the present control methods, it is either essential to use graphs showing the actual D.P. or else to determine the latter independently by using viscosimetric measurements of sol solutions of low concentration.

The importance of mean D.P. in judging paper pulp is pointed out by the author. In one instance, mildly bleached spruce



sulphite pulp showed a mean D.P. of 1625 and a viscosity number of 2296 seconds; a soda pulp from pine showed a D.P. of 1000 and a viscosity number of only 482 seconds. However, these pulps showed a very similar tear length (10,600 and 9,800 m. respectively); bursting strength, and identical folding endurance. When the spruce pulp was bleached to a point where the D.P. was 470, and the pine pulp to a D.P. of 210, the strength tests dwindled markedly (especially folding endurance). Here, again, it is evident that at D.P. of 1000 or above, there is no great change in strength of pulps despite tremendous viscosity differences. The accompanying figure shows the tear length (Reisslange), folding endurance (Falzungen), bursting strength (Berstdruck) and viscosity of pulps plotted against their D.P. (Polym. Grad). While the viscosity curve rises rapidly between a D.P. of 1000 and 1500, the other curves flatten out at about D.P. 1000. H. Staudinger and F. Reinecke. Papierfabr. 36 (Tech. Wiss Tl.) 489-95 (1938).

Oil Resistance of Paper and Printability

Since oil resistance is of marked importance in gaging the printing properties of paper, and as it is a measure of the ease of penetration of inks and related to printing difficulties (like offset, strike-through, lack of gloss, etc.), the author has studied some of the laws governing penetration into paper. The influence of temperature on oil penetration is about 9 per cent per deg. C.

Oil resistance measurements must be corrected by using viscosity-temperature tables. Storage of paper samples should be made at relative humidities as low as possible, since increases in atmospheric humidities causes a permanent decrease in oil resistance. An increase in relative humidity from 40 per cent to 95 per cent may decrease the oil resistance as much as 60 per cent. Using castor oil, tung oil, linseed oil, fish oil, and mineral oils, in oil flotation measurement, it is indicated that the time of absorption is proportional to the ratio:— oil viscosity/surface tension of the oil, but is otherwise independent of the chemical composition of the oil. As measured by flotation, the oil resistance of a sheet is proportional to the square of the caliper, while air resistance is proportional to the first power of the caliper. Recalculating porosity measurements to a standard caliper of 0.01 cm. has led to the computation of specific internal oil resistance and specific air resistance of a paper. Assuming that the sheet has a homogeneous capillary system, uniformly distributed, the specific internal oil resistance

$$= \frac{S}{F} \times \frac{2Z^2C^2}{r\ \mathrm{Cos}A},$$

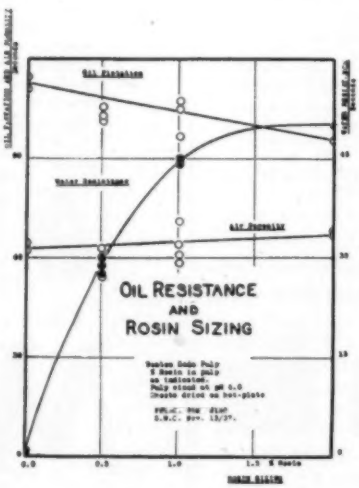
and the specific internal air resistance

$$= \frac{8sCZ^2}{(\text{air content})\ r^2P},$$

while the surface oil resistance

$$= \frac{S}{F} \times \frac{2}{r\mathrm{Cos}A} \times \frac{V^2}{(\text{air content})^2}$$

(in these formulae, (S) and (s) are respectively the oil and air viscosities; (F) is the surface tension of the oil, (V) is the oil volume used per cm^2 in measuring surface oil resistance, (P) is the air pressure in the air resistance test, and (Z) is the crookedness factor, (r) is the mean effective radius of a system of capillaries, which have the effective length of (ZC).



The oil makes an angle of contact (A) with the capillary wall.

It has been found, both for hand sheets and for machine made papers, that the oil resistance of the surface layer is from 7 to 200 times as great as that of a layer of equal thickness in the interior of the sheet. While dependent to a certain extent on the specific internal oil resistance, the surface oil resistance is influenced largely by the increased density of the surface, due to the action of surface tension forces during sheet formation; by the presence of many small areas of high oil resistance; and by the increased surface density caused by supercalendering. The surface oil resistance of a sheet cannot therefore be predicted from oil flotation measurements. It seems to be a distinct property of the sheet which must be separately evaluated by a suitable method. With unchanged bulk, a sheet containing the finer fibrous material has the higher oil resistance. (Mechanical pulp sheets, for example, are more oil-resistant than are chemical pulps of the same bulk). Wet-pressing gives a less oil-resistant sheet than does beating or calendering, due presumably to the breaking up of fibrous material, and greater reduction in capillary radius. The oil resistance of a mixture of pulps may in general be calculated from the specific oil resistance of the components.

The author has described a method for determining comparative oil wettability, and these measurements were carried out on soda pulps varying in printability and on sample sheets containing small amounts of "wetting" materials. The addition of 2 per cent rosin size increases oil wettability by some 25 per cent. The original paper, which should be consulted for details, contains 10 tablets and seven figures, of which only one is included in this abstract. This graph shows that 2 per cent rosin has little effect on air resistance, but has a marked influence on oil resistance, which is greatly decreased. Water-resistance, on the other hand, is increased on sizing. G. L. Larocque. Paper-maker and British Paper Trade J. 96 (Tech. S.) 162-177 (1938).

Effect of Animal Size on Paper Properties

Paper samples made from pine (?) sulphite pulp and sized with rosin, and rag paper samples sized with rosin and gelatin respectively were examined at 40, 50, 65, and 85 deg. relative humidity. The breaking length, stretch, folding endurance, bursting strength, curl, ash, moisture and apparent size content were determined. The gelatin content of surface sized papers was determined by simple extraction with boiling water, but the results are erroneous, since some rosin is also removed. It was shown that factors for calculating stretch and breaking length at a relative humidity of 65 degrees, from data at other degrees of humidity were unreliable. They vary with the type of paper examined and the direction in which the test sheets are cut. The folding endurance number (Schopper) is correlated with the breaking strength and suppleness of the paper, and it is impossible to calculate a factor for converting such a number at a certain degree relative humidity into that at 65 degrees relative humidity. The pop test was little affected by relative humidity. Gelatin size is practically without influence on the moisture content of the paper, but greatly diminishes the rate at which paper absorbs water from the air. J. J. L. Luti, Chem. Weekblad. (Dutch), 35, 211-8 (1938), through British Chem. Abs. B; 449 (1938).

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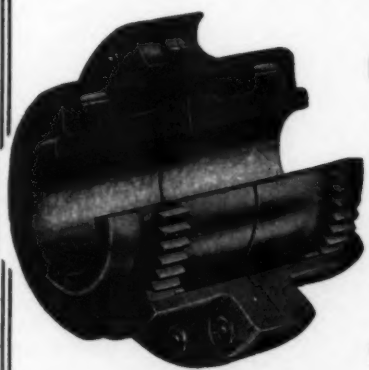

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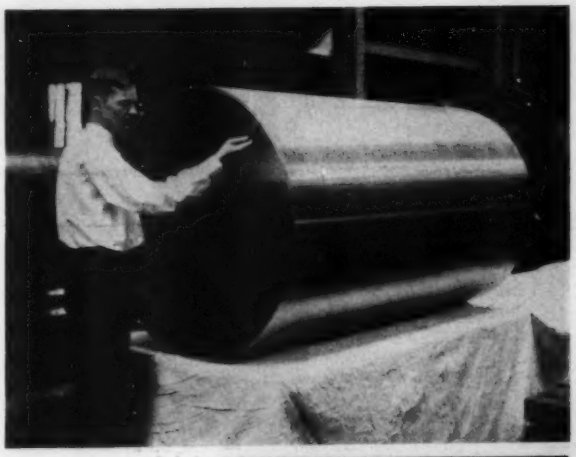

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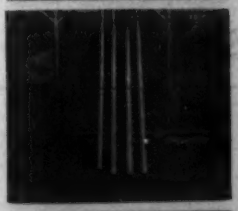

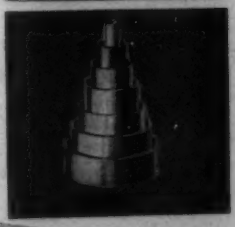

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PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Safety Paper and Method of Making Same

Patent No. 2,129,363. Francis L. Simons, Needham, and Mark W. Weiss, Boston, Mass., assignors to George La Monte & Son, Nutley, N. J., a corporation of New Jersey. Application November 21, 1936, Serial No. 112,009. 11 Claims. Cl. 283—8). A safety paper which comprises a sheet of material presenting a surface of a color other than white and indicia overlaying a plurality of portions of said surface leaving other portions exposed which indicia are of a substantially lighter shade of color with regard to the color of said surface and which indicia are composed of material adapted to have the permeability thereof to light increased to substantial extent upon the application of a liquid thereto.

Greaseproof Gummed Paper

Patent No. 2,126,192. Ferdinand W. Humphner, Oak Park, Ill., assignor, by mesne assignments, to Mid-States Gummed Paper Company, a corporation of Delaware. Application September 30, 1935, Serial No. 42,973. 5 Claims. (Cl. 91—68). A greaseproof gummed paper for labels and the like comprising a strip of paper having at least one side thereof coated with a water-insoluble oil-resistant lacquer, a water soluble adhesive on said lacquer, said adhesive being fractured throughout to prevent curling, and an organic solvent for said lacquer remaining in said adhesive for uniting said adhesive to said coating.

Light Sensitive Paper and Method of Treating Same

Patent No. 2,130,071. Clyde A. Crowley and George H. Goodyear, Chicago, Ill., assignors to The Huey Company, Chicago, Ill., a corporation of Illinois. Application April 29, 1938, Serial No. 205,008. 3 Claims. (Cl. 95—6). A coating for blue print paper comprising a light-reducible ferric complex, a ferricyanide salt and a cesium salt.

Forming Paper Webs

Patent No. 2,134,408. William R. Kellett, Menasha, Wis., assignor to Paper Patents Company, Menasha, Wis., a corporation of Wisconsin. Application August 6, 1936, Serial No. 94,517. 7 Claims. (Cl. 92—44). The method of continuously forming a paper web on a Fourdrinier wire, which includes: confining a body of dilute paper stock under pressure over an exposed zone of the upper surface of a traveling Fourdrinier wire in advance of a slice, the length of said exposed zone in the direction of wire travel being sufficient to effect the drainage of most of the water from the stock before it reaches said slice and to form on said wire, in said pressure zone, a mat containing approximately all of the fiber required for the weight of web desired, said pressure being such as to produce a spouting velocity at the lip of said slice substantially equal to the speed of said wire; and spouting a relatively thin layer of dilute paper stock directly from said body onto said mat as it passes under said slice.

Method and Apparatus for Drying

Patent No. 2,133,424. Ross H. Buckwalter, Joliet, Ill., assignor to Star Peerless Wall Paper Mills, Chicago, Ill., a corporation of Illinois. Application November 17, 1934, Serial No. 753,457. 7 Claims. (Cl. 34—48). A method of drying a continuous web of material comprising forming the same in a succession of folds, and carrying the folded web past streams of a drying medium directed against the opposite side edges of the web, the impact of the streams on each other while passing through the folds above and below the web imparting a shaking movement to the web and facilitating the drying action of the medium.

Method and Apparatus for Coating Paper

Patent No. 2,135,406. Donald R. Macdonald, Leominster, Mass. Application September 15, 1936, Serial No. 100,925. 8 Claims. (Cl. 91—59). An apparatus for coating paper comprising means for applying a coating material to a traveling web, means for smoothing said applied material and effecting a partial removal of surplus material from said web, auxiliary means for effecting complete removal of any surplus coating material already partially removed by said smoothing means, and deposited on said smoothing means, and means for adjusting said auxiliary means relative to said smoothing means.

Woven Wire Fabric for Dandy Rolls, Cylinder Molds, or the Like, for Paper Making Machines

Patent No. 2,134,293. Nelson W. Webb, Belleville, N. J., assignor to Eastwood-Nealley Corporation, Belleville, N. J., a corporation of New Jersey. Application June 4, 1936, Serial No. 83,520. 6 Claims. (Cl. 245—10). Loom woven wire fabric for use as a cylindrical sieve in paper making machines comprising interwoven warp and weft wires, and seam forming wires loom woven into said fabric as warp wires in predetermined spaced relation determined by a standardized circumference of cylinder, and each comprising a wire of similar composition to the other warp wires together with solder contiguous to and simultaneously woven with said seam forming wire adapted through the application of heat to solder said seam forming wire to the weft wires, said warp wires adapted to extend parallel to the axis of said cylindrical sieve.

Process and Apparatus for the Longitudinal Creping of Webs of Paper or Other Sheet Material

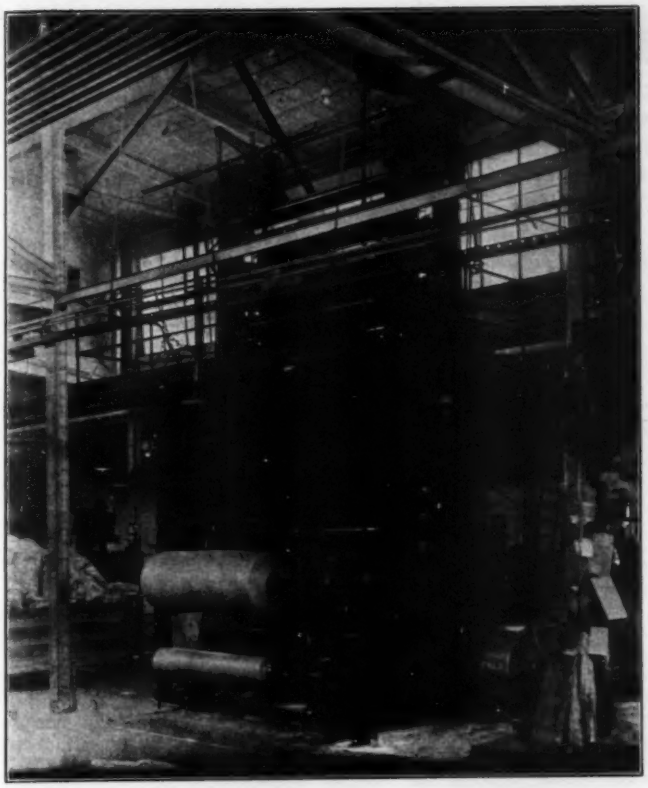
Patent No. 2,130,007. Rudolf Haas, Berlin-Zehlendorf, Germany, assignor of one-half to Zellstofffabrik Waldhof, Mannheim, Germany, a joint-stock company of Germany. Application January 4, 1938, Serial No. 183,348. In Germany January 20, 1937. 5 Claims. (Cl. 154—30). A process for the longitudinal creping of a web of sheet material, particularly paper, which comprises passing the web over a body having a curved surface which corresponds to part at least of the curved surface of a roller having a stationary curved axis as a reference line and in a direction from the convex toward the concave part of said surface, and pressing the web against said surface by air pressure action while passing it over the same.

Method and Apparatus for Coating Paper and the Like

Patent No. 2,130,060. Russell S. Bracewell, South Hadley, Mass. Application August 26, 1935, Serial No. 37,844. 15 Claims. (Cl. 91—44). A device for coating webs of paper and the like which comprises a roll for taking up color from a color supply, said take-up roll being formed with circumferential grooves, a transfer roll having circumferential ribs running in the grooves of the take-up roll and receiving color therefrom, a spirally grooved roll slightly spaced from the transfer roll to receive color therefrom by centrifugal action and means to present the surface to be coated in close proximity to the spirally grooved roll to receive color therefrom by centrifugal action.

Process and Machine for Making Crushed Corrugated Papers

Patent No. 2,139,285. William Wallace Rowe, Cincinnati, and Warren A. Morris, Wyoming, Ohio, assignors to The Paper Service Company, Lockland, Ohio, a corporation of Ohio. Application November 21, 1934, Serial No. 754,030. 17 Claims. (Cl. 154—31). In a corrugating apparatus, the combination of corrugating means comprising belts traveling with a web upon both sides thereof, crushing means through which said web is led, said corrugating means also passing through said crushing means, and means beyond said crushing means in the direction of travel of said web to cause said belts to leave the surface of said crushing means so as to permit the subsequent withdrawal of said web from said belts.



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Convention Papers . . . Abstracted

The accompanying abstracts are of papers presented at the Annual Meeting of the Technical Section of the Canadian Pulp and Paper Association, Montreal, January 25-27, 1939.

Progress in the Removal of Dirt from Pulp and Paper

H. FREEMAN and C. H. SKELTON

Some quite recent developments in connection with the use of the Vortrap were described. It was observed at the Laurentide mill of Consolidated Paper Corporation that, if an escape is provided in the receiver so that a positive flow through the waste pipe is maintained, the appearance of the newsprint sheet is noticeably improved, chiefly through the greater elimination of light impurities having a specific gravity very close to that of the desirable pulp fibers. The quantity of good fiber removed with the light dirt, however, was considerable, from 2 per cent to 4 per cent, and it became necessary to reclaim it. This was accomplished by making use of a secondary Vortrap, through which was passed the dirt and stock bled from the receivers of the primary Vortraps. A small flow was bled from the receiver of the secondary Vortrap, but as it represented only a small fraction of the total flow, it was run to waste. The discharge from the secondary Vortrap, while not perfectly free from dirt, contained no more than the original stock before passing through the primary Vortraps; and as the quantity was low in comparison with the total flow to the machine, this discharge was returned to the white water system. There is at present only one paper machine at the Laurentide mill equipped with Vortraps, and the appearance of the paper made on this machine is noticeably better than that made on the other machines. The device is not intended as a substitute for screens, but to be used in conjunction in them, and it is generally installed just before the paper machine screens.

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Lignin Investigation[1]

In order to arrive at the structure of lignin, it is advisable to isolate it from wood in as nearly as possible the same state as it exists in the wood. The old methods using concentrated hydrochloric or sulphuric acids are much too drastic and produce considerable modification in the structure of the isolated lignin. Certain organic solvents containing small amounts of activator, more particularly ethyl alcohol containing some hydrochloric acid, remove lignin from wood under much milder conditions; and the lignin can be recovered by precipitating in the extract by dilution with water. Only about half of the lignin present in wood could be recovered in this way, and by extraction with ether of the filtrate from the precipitated lignin there were obtained distillable oils which were fractionated into four fractions: phenolic, acid, neutral and aldehydic. Softwoods and hardwoods gave essentially the same results, except that the amount of oils obtained was considerably greater in the case of the hardwoods (maple). The aldehyde fraction obtained from oil from softwood consists largely of an aromatic ketone which would seem to be one of several possible isomers, each consisting of a guaiacyl group with a side chain of three carbon atoms containing a carbonyl and a hydroxyl group; in the case of hardwoods, the aldehydic fraction seems to consist in part of the same ketone and also of a similar ketone containing the syringyl group.

The lignin building unit is thus seen to contain some very reactive groups, and these are probably protected in the plant by other constituents, presumably the pentosans and hemicelluloses. In favor of this hypothesis, it may be said that lignin obtained by treating wood with ethyl alcohol and hydrochloric acid was successfully combined with xylan, and the product proved to be very similar to lignin as it occurs in wood.

Precipitated ethanol-extracted lignin was dissolved in dioxane and subjected to hydrogenation in presence of a copper-chromium oxide catalyst with the result that the dirty-brown solution turned quite clear and white. On fractionation there was obtained 8 per cent of water, 10 per cent of methyl alcohol, 5 per cent of ethyl alcohol, 17 per cent of various hydrogenation products, and 32 per cent of high-boiling oils, which were practically resins. A study of these fractions would indicate that at least 60 to 70 per cent of the lignin in wood is built up by means of a C_6-C_3 unit. Similar results may be obtained using sulphuric acid lignin or soda lignin, instead of ethanol lignin.

A study into the nature of the coloring matter present in kraft pulp gave results pointing quite strongly to this material being of an lignin type, not a phlobatan. It would seem to be mainly a lignin degradation product, together with some product of humification of sugar material.

[1]This is the gist of a brief symposium on the investigations on lignin and cellulose being carried out under the direction of Prof. Harold Hibbert, at the Cellulose Research Institute, the various phases of this very comprehensive scheme being explained by the students who are working on them at the present time.

Use of Organic Colloids In the Production Of Pure Steam

DR. L. D. BETZ

Dr. Betz outlined work at present being carried out on the use of organic reactive colloids (the nature of which he did not disclose) in the internal treatment of boiler water. Control of the quality of the steam necessitated the development of an accurate and sensistive continuous method for measuring minute quantities of solids in condensed steam. This has been successfully accomplished, using a Micromax Recorder graduated in micromoles, 1 micromole being equivalent to approximately 0.6 part per million of solids in the condensed steam. Comparative experiments carried out by Dr. Betz with sodium metaphosphate and sodium hydroxide on the one hand, and with anhydrous disodium phosphate plus organic reactive colloids on the other, showed that the latter permitted the water in the boiler to build up to a considerably higher alkalinity and total solids contents before carry over or priming occurred, than was the case with metaphosphate plus sodium hydroxide.

Sodium Aluminate In Paper Making

T. W. WESTLAKE
Provincial Paper, Ltd.

Mr. Westlake described experiments which he carried out very recently on the use of sodium aluminate, as compared with alum and sodium hydroxide or alum and slaked lime, to raise the pH value of the stock for book grade papers from 4.4 to 6.5. He arrived at the conclusion that the use of sodium aluminate or of alum and sodium hydroxide does not seem justified from a cost standpoint. Use of sodium aluminate may have technical justification in certain special cases, such as in the presence of special expensive fillers (e.g., titanium dioxide), maximum retention of which is imperative, or again when the furnish includes a very high filler content and very free stock. Its application, however, even

under such conditions, would require the development of more satisfactory equipment for the continuous addition of the aluminate to the stock.

The Bell Drying System

L. C. ANDERSON, Manager
Ontario Paper Company, Ltd.

This paper was essentially in the nature of a progress report. After reviewing current practices in pulp, paper or board drying, more particularly as regards heat recovery systems, he proceeded to describe the work that has been carried out to date on the system designed and developed by John Bell. It consists essentially in mounting the drier section of the paper machine in a practically totally enclosed space, out of direct contact with air, withdrawing the steam vaporized from the paper, compressing it and returning it to the drying cylinders. The results obtained to date are interesting and very promising.

Moisture in Fine Papers Made from Wood Pulp

J. B. BECK, Chief Chemist
E. B. Eddy Company, Ltd.

The advantages of making paper containing the proper amount of moisture were discussed. Most sheets do not contain the full amount of moisture they can hold, the two main reasons for this being: (1) Due to the method of sampling and taking the moisture test, many mills do not know the amount of moisture actually in their paper. (2) Due to machine conditions many mills find it impossible to maintain as high a moisture content in their papers as the papers will hold. When an attempt is first made to raise the moisture content there will be plenty of grief, as it means changing the calender nips for different finishes and usually means changing machine conditions to get a more even sheet across the machine. Any mill that has been overdrying its paper will find that it pays to get the higher moisture content because of better customer acceptance.

Studies in Cellulose-Moisture Phenomena

PROF. OTTO MAAS and DR. W. BOYD CAMPBELL

The cellulose molecule, in the sense in which the term is used by organic chemists, is pretty definitely known to consist of a chain of similar groups joined by oxygen links, each unit being a glucose anhydride group ($C_6H_{10}O_5$). Common agreement is nearly reached that the chain length seems to be indefinite. The long chain-molecules, at least to a large extent, are arranged parallel to one another to form a crystal pattern. There is evidence that there are as a rule about 50 to 70 such chains in the cross section of the bundle forming the crystal pattern.

Maas and Campbell's idea is that the fiber consists of a network of branching crystals with many "faults" or open spaces between the elements. The essential point in this concept is that the crystalline nature of the cellulose lies in the regular spacing of the C_6 groups rather than in the arrangement

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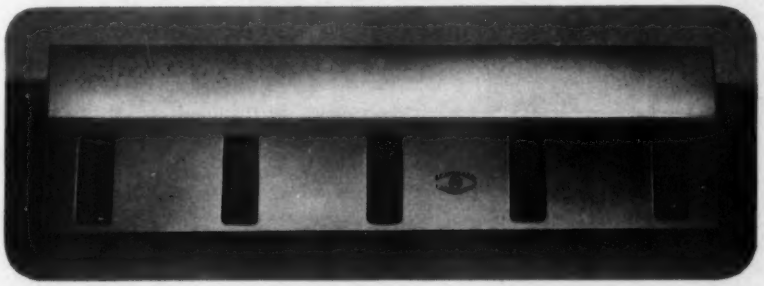

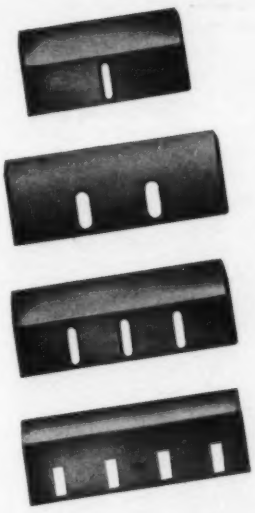

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of the long molecules, though some degree of regularity in the arrangement of the chains must follow.

Adsorption and desorption isotherms of standard cellulose and of a pure sulphite pulp were studied. A comparison of the isotherms for different pulps may be interpreted as giving a comparison, to a large extent, of the total crystallite surfaces. Comparing sulphite pulp with standard cellulose, the greater sorbing power of the former can be explained as being due to the fact that in such a pulp there is a much greater inner surface. Results obtained in the study of the sorption and desorption isotherms with liquids other than water agree on the whole with the proposed mechanism of water sorption.

The heat of wetting cellulose depends on the amount of water added. As the cellulose contains more and more sorbed water, the heat of sorption of additional water becomes less and less. Finally, before fiber saturation is reached, the heat of sorption is zero.

The heat of wetting sulphite pulp is considerably greater than that of standard cellulose, which is in agreement with the concept that the sulphite pulp has a greater internal area than standard cellulose, as sorption isotherms indicated.

The specific volume of standard cellulose by displacement of helium is 0.64. When immersed in water, the specific volume is 0.621. When immersed in acetone, it is 0.642. In benzine, it is 0.644.

The dielectric constant for the first water adsorbed by bone-dry cellulose is very much less than that of free water, approximately that of ice at low temperatures. With further addition of water, the dielectric constant increases gradually until at fiber saturation it approaches that of free water.

Contrary to expectation, it was found that the specific heat of water adsorbed on cellulose is definitely above the specific heat of free water to an extent well beyond experimental error.

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Suitability of Wood for Acid Pulping

H. GREEN and F. H. YORSTON

It was the opinion of Messrs. Green and Yorston that wood which gives abnormally weak sulphite pulp occurs in small but variable quantities in a large proportion of spruce and balsam logs. In the tree, this wood may constitute only a sector of certain annual rings, older and younger wood as well as the opposite sector of the same ring giving good pulp. The wood in question generally appears normal to casual inspection or when sectioned and examined under the microscope. The defect which is responsible for the poor quality of pulp from the wood in question seems not to have been noticed previously. Pulp produced by cooking this so-called "susceptible" wood was neither weaker nor appreciably shorter-fibered than that from normal wood. No cause for the occurrence of this susceptible wood has as yet been found.

DISCUSSION

Mr. Fordyce explained at some length the work which he is carrying out under the direction of Professor Hibbert on the development of a viscosity method for the accurate evaluation of pulp properties, and more particularly of cellulose depolymerization in rayon pulp. The basis of the investigation is Staudinger's equation:

$$n_{sp}/_c = K_n M$$

in which $n_{sp}/_c$ is the specific viscosity, K_n is a constant and M is the molecular weight of the cellulose. This equation is applicable only to what Staudinger calls polymer-homologous series. At 1 per cent concentration, the equation is roughly correct, but at concentrations of 0.15 per cent or less it holds much more accurately. Polyethyleneglycols (which constitute a polymer-homologous series) of molecular weight up to over 8000 were prepared in the pure state, and viscosity determinations on these compounds showed that Staudinger's relation holds. A relation has been worked out by Schultz for the value of K_n in the case of polymeric mixtures, and he found that the value was slightly higher than for pure compounds of the same series. From these results it is hoped to be able to work out a method of obtaining a fairly accurate idea of the distribution of the molecular weights around the average molecular weight, which should give a true picture of the properties of the pulp.

Suction Box Covers

W. B. SCOTT
Consolidated Paper Corporation

Mr. Scott gave a summary of the answers received from twenty-three mills to a questionnaire on suction box covers sent out by the News Print Committee of the Technical Section. No definite conclusions are drawn, but the compilation gives a good cross section of present practice and experience. Professor Keays commented that, at Laurentide, tests carefully carried out on the paper machines had shown a 60 per cent increase in wire life on installation of end-of-grain maple suction-box covers, and also a definite increase due to the installation of the Vortrap.

Requirements of Folding Board

DR. W. BOYD CAMPBELL

Dr. Campbell made an analysis of the board-folding operation, which showed that the quality of the liner is a minor factor in securing good fold; the major factors are the inner structure of the board and the proper performance of the creasing operation. When a piece of homogeneous material, such as a sheet or bar of metal, is bent moderately, the center section retains its original length, the layers lying on the inside of the curve are compressed and those lying on the outside are stretched; if the bending is more severe, so that the metal is strained beyond the elastic limit, the ductility of the metal may permit enough extension of the outside layer to allow of a smooth bend (possibly accompanied by some crumpling of the inner layer which is under compression). Paper board has practically no ductility; the utmost amount of stretch in any ordinary paper is about 5 per cent and few papers permit of more than half this amount. To permit of a 90-deg. fold with the inner radius of curvature equal to the sheet thickness requires that the outer layer stretch 33 per cent while the inner one contracts 33 per cent; paper board simply cannot fold in this manner.

The difficulty is overcome by the creasing operation—before folding, the board is creased by applying pressure to the face of the board by means of a blunt knife or a roller while the board is supported from below almost, but not quite, up to the line where pressure is applied. If all is well, when the creased board is bent the outer liner will pass unbroken around the bend, while the inside liner will form a ridge or "bead" along the inner, and hidden, angle. If, however, the creasing is not of a nature to permit of sufficient crumpling of the inner layers at the fold, the bending will impose more tensile stress on the outer layer than it will bear; it must then crack because it cannot stretch to any extent.

If a properly made fold is examined with a magnifying glass, it is seen that the plies have become separated from one another in the folded area and that most of them bend backward in the direction in which they were forced during the creasing operation. It is this rupture of the bonds uniting the center plies which permits of the face ply going around the corner without breaking. While it is possible to crease and bend almost any board, there are great differences in the amount of care required to get proper creasing conditions. Since the production of a good fold depends on the effectiveness of the creasing operation in causing the plies to separate, it follows that the more readily they separate the more easily is the board creased and folded; a high moisture content due to high humidity at the time of creas-

ing is of great assistance; likewise, any machine or furnish conditions tending towards weak adhesion between plies will aid folding quality.

To sum up, if due attention is paid to the principles of the creasing requirements, a good board maker can make a board any box maker can fold, and a good box maker can fold almost any board a board mill supplies.

The Refining of Groundwood Secondary Rejects Using a Continuous Batch System

WALTER W. HOLLAND

A description of this refining method, was presented without making any comparisons as to the merits of refiners, systems or refined stock. The system is an adaptation to the requirements of the Thorold mill of Ontario Paper Co. of the Noble & Wood groundwood refiner, and provides more particularly for recirculation. The motor operating the refiner is rated at 650 hp., but at present only 450 of this is available. The apparent capacity of the unit on two-pass operation is 9 to 10 air-dry tons per day at 45 hp. per daily ton. It is expected that the production will increase proportionately when the full motor load is made available. The quality of the refiner furnish varies with the changing seasons and changing wood conditions. As a uniform product is wanted at all times from the refiner, the production is varied to obtain it, processing being sometimes over 10 tons per day and at other times 9 tons or slightly less.

The Groundwood Mill and Its Relation to Modern High-Speed News Operation

J. D. BROWN

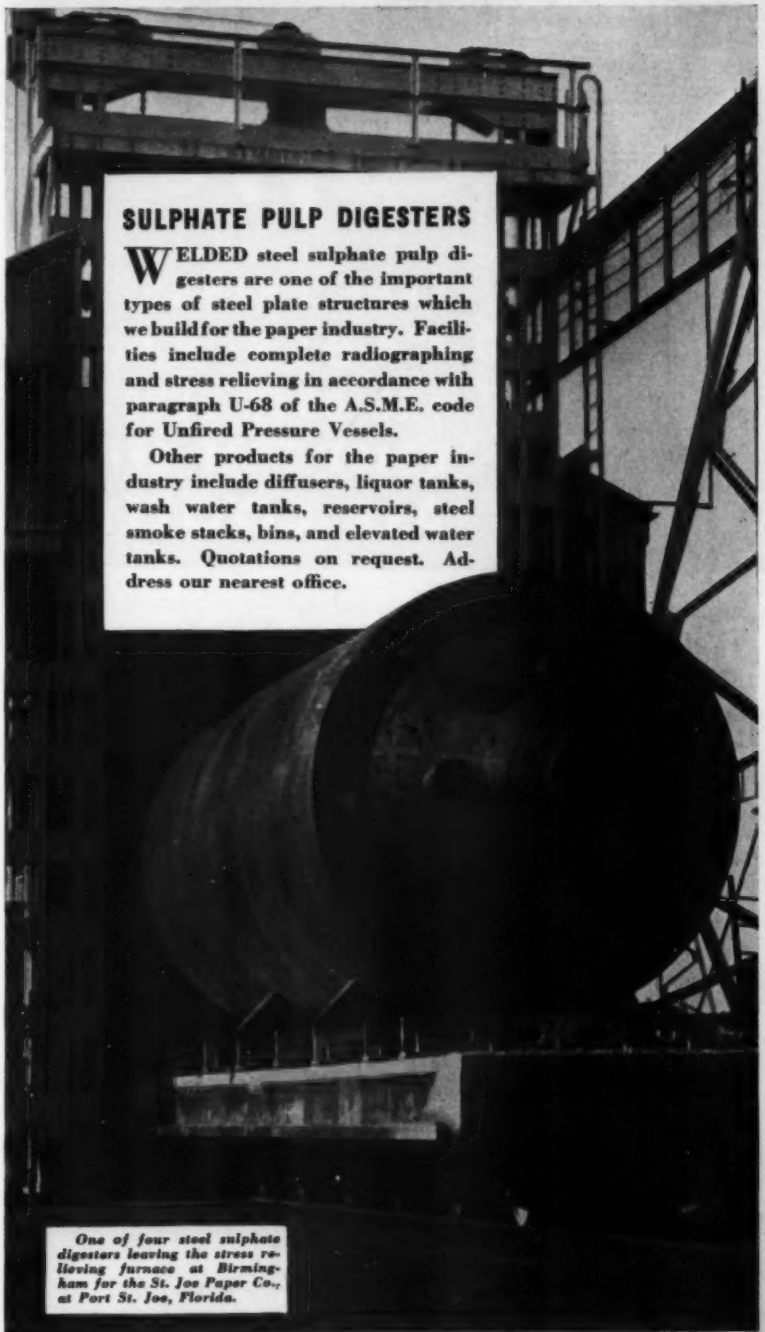
Canadian International Paper Company

Drawing attention to recent trends in newspaper advertising, and more particularly to the losses sustained in favor of the radio and of weekly periodicals, Mr. Brown thinks that the answer seems to be better quality of paper to take color printing at the same or even lower costs than are in effect today, and this must be done by improving the groundwood quality to a point where strength, opacity and finish of the sheet can be achieved with sulphite furnish not exceeding about 5 per cent.

Assuming that maximum care is given to the sharpening operation and the sharpening equipment, that the grit of the stones is carefully and well selected for the particular operation in hand, and that burring interval is watched closely with relation to quality of fiber produced, there are still the following variables that play an important role in pulp quality: temperature, consistence, load, refining, wood quality (size and species), and seasonal changes (age).

While temperature is very well taken care of so far as grinderpit stock is concerned, nothing is known of the temperatures at the point of contact of the wood and the stone during the grinding process nor of their influence on the quality of fiber ground. The same is largely true of pit consistences in relation to temperature and stone surface.

Stress Relieved



SULPHATE PULP DIGESTERS

WELDED steel sulphate pulp digesters are one of the important types of steel plate structures which we build for the paper industry. Facilities include complete radiographing and stress relieving in accordance with paragraph U-68 of the A.S.M.E. code for Unfired Pressure Vessels.

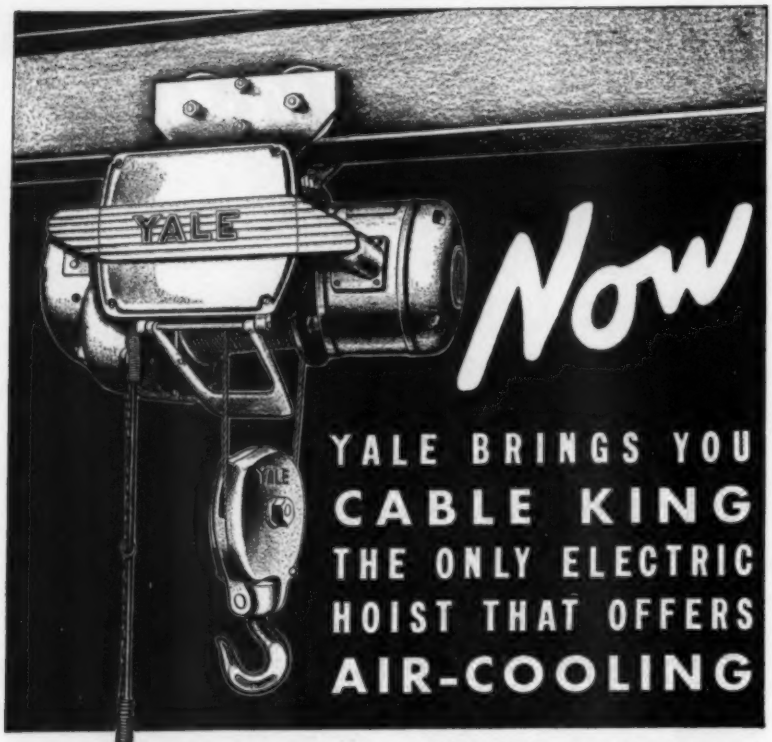
Other products for the paper industry include diffusers, liquor tanks, wash water tanks, reservoirs, steel smoke stacks, bins, and elevated water tanks. Quotations on request. Address our nearest office.

One of four steel sulphate digesters leaving the stress relieving furnace at Birmingham for the St. Joe Paper Co., at Port St. Joe, Florida.

CHICAGO BRIDGE & IRON COMPANY

Cleveland.....2267 Rockefeller Bldg.
Birmingham.....1511 North Fiftieth Street
Tulsa.....1651 Hunt Bldg.
Houston.....2919 Main Street
Detroit.....1566 Lafayette Bldg.
Philadelphia.....1653-1700 Walnut Street Bldg.
Boston.....1562 Consolidated Gas Bldg.
Los Angeles.....1459 Wm. Fox Bldg.
Chicago.....2445 Old Colony Bldg.
New York.....3330-165 Broadway Bldg.
Dallas.....1446 Liberty Bank Bldg.
San Francisco.....1017 Rialto Bldg.

Plants at Birmingham, Chicago and Greenville, Pa.



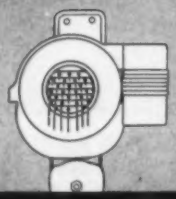
Introduced by Yale just a short time ago, the Cable King with its AIR-COOLING feature is already skyrocketing its way to leadership in the electric hoist field. NOW everybody wants AIR-COOLING!

The reason is simple. AIR-COOLING saves the operator money. The basic limiting factor in electric hoist construction has always been excess brake heat. When Yale engineers adapted the special sirocco blower action that would cool the brake frictional parts they, *for the first time,* made it possible to eliminate this heat.

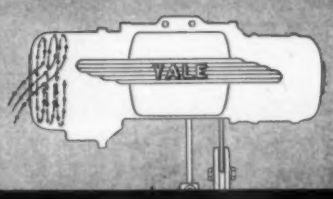
That's the principle of AIR-COOLING—a principle that permits *the Cable King to operate on a heavier duty cycle than any other hoist in the same class.* And that means *greater economy than any other hoist in the same class!*

In addition, the precision construction of the Cable King makes it the closest approach to perfect engineering specifications that has ever been built. AIR-COOLING plus mechanical perfection—that's what you get in the Cable King. It's the very latest advance in hoisting equipment. Contact your local distributor or send direct for free catalogue.

STARTLING AND EXCLUSIVE AIR-COOLING PRINCIPLE . . .



The Greatest Economy Factor Ever Developed in Electric Hoist Construction.



YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

Some experimental work has been done with the ues of high loads, the results of which seem to indicate, among other things, a longer freer stock with fewer fines. From the particular standpoint under consideration, this is both an achievement and a loss: the longer fiber presumably can replace sulphite in some measure, but by reducing fines the sheet is opened up and its opacity decreased.

As regards refining, the question seems to devolve upon what class of fines are required in a particular operation. Wood quality, including species, size and seasonal changes is probably the most important factor of all and the one about which the least has been done. Large sums are being expended annually for control within the mill and practically nothing for the control of the principal raw material.

Slime Troubles in a Newsprint Mill

JOHN WING
Anglo-Canadian Pulp and Paper Mills, Quebec

The speaker briefly indicated and discussed the chief factors involved in slime trouble in newsprint mills, and the principal methods which have been proposed for its control. As slime growths develop best over a certain pH range and temperature range, outside which formation is greatly reduced, adjusting conditions accordingly might prove advantageous. Various reasons militate against the use of very high or very low pH, but any large increase in system temperature would help to correct slime troubles. More complete utilization of groundwood white water would effectively raise system temperature, provided some efficient method of removing dirt and fines could be found; this would at the same time prevent the accumulation of such material in the system and eliminate wastage of so much warm water to the sewer. A method of utilizing waste heat from the paper machine exhaust stacks has been suggested for increasing the temperature of raw water which is added directly to the system. Since one of the greatest troubles caused by slime is its growth on metal surfaces, a solution might be found in the use of a material for handling stock and white water to which the slime would not adhere and therefore have no chance to grow to the troublesome size or to accumulate in thick layers. Copper and bronze would seem to be suitable for this purpose, and a recently developed type of rubber paint is at present attracting attention.

◆

Preparation of Alum Solution for Paper Sizing

Patent No. 2,138,840. Judson A. De Cew, Mt. Vernon, N. Y. Application July 12, 1934, Serial No. 734,712. 1 Claim. (Cl. 92—21). A process of making a true solution of sulphate of alumina for paper sizing having a pH of from between 3.8 and 4.2 which comprises the addition to an aqueous solution of commercial sulphate of alumina of an aqueous solution ot a member of the group consisting of lime, magnesia, soda, the carbonates thereof, and the acetates thereof.

POTPOURRI

SOUTHERN STATES RALLY TO SUPPORT LABORATORY

APPEALS for aid in the financing of the Herty Foundation Laboratory, Savannah, Georgia, have resulted in favorable response by every Southern State legislature and in addition, Southern business men are getting behind the development of the Southern newsprint industry to a greater and greater extent, it was indicated by Donald R. Brewster, field director of the Savannah laboratory. Mr. Brewster, speaking before members of the North Carolina Press Institute at Chapel Hill, North Carolina, pointed out the various reasons why the laboratory at Savannah, where the late Dr. Charles H. Herty perfected the process of making Southern newsprint, is a good investment.

"Very favorable response has been received from newspaper publishers and business men in all of the Southern states, the legislatures of which meet this year," Mr. Brewster said, "and all have indicated a general desire to support financially the work of the Herty Foundation Laboratory. I have yet to receive an unfavorable response.

"With our tremendous area of 200,000,000 acres of commercial forest land in the South, we can easily produce as much pulpwood as the American market can use and enough to supply expanding world markets in addition. With our favorable climate and fast-growing valuable species, we can grow ample supplies of wood not only for ourselves but other countries as well.

"The important part a laboratory plays in the starting of a mill," Mr. Brewster pointed out, "is the technical assistance in both design and operating problems."

An example of this usefulness was pointed out recently when a carload of pine logs from the East Texas timber belt was converted into newsprint at the Herty Laboratory. The test run, utilizing the process developed by Dr. Herty, was witnessed by officials of Southland Paper Mills, Inc., which firm is establishing a newsprint mill at Lufkin, Texas.

Albert Newcombe, treasurer of the Texas firm, said the test run of newsprint looked "grand," a statement which was corroborated by paper experts who pronounced the product, "highly satisfactory." According to Dr. Charles H. Carpenter, technical director of the laboratory, the run was with completely closed white water system and practically no water was wasted. Dr. Carpenter indicated that such a method would represent a great saving in manufacturing operations on a commercial scale.

◆

PROTEST OLYMPIC PARK EXTENSION

Civic and labor groups and other organizations of Olympic Peninsula communities in Washington have joined in resolutions urging President Roosevelt not to extend boundaries of the new Olympic National Park westward into commercial timber areas. Contending the future of the extensive pulp and paper industry of western Washington, as well as considerable lumbering, is threatened by the possible westward extension of the parks, the organizations are asking that any increase in the park be in scenic areas on the north side, rather than in the commercial timber section.

The Olympic National Park, containing approximately 642,000 acres of mountain wilderness and timber, was created at the last session of Congress. The bill authorized extension of the boundaries by presidential proclamation at a later date to add a maximum of about 300,000 acres.

◆

PLZAK TALKS ON SOCIALIZATION OF MEDICINE

Socialized medicine, as proposed, may be burdensome to both employee and employer from a standpoint of taxation, it was stated by J. J. Plzak, claims department manager of the Consolidated Power and Paper Company, in an address at Wisconsin Rapids, Wisconsin, recently.

STOP MESSING AROUND WITH SLIME!

End slime troubles *quickly, thoroughly* and *economically* in beaters, stock chests, head boxes, paper machines—and every location where slime means trouble and ruined quality.

Magnus Slime Remover

Kills bacteria and fungus growths and renders them non-adhesive. This retards slime growths and reduces frequency of cleaning.

Penetrates, loosens and removes all deposits. All slime constituents are held in a stable, finely divided emulsion that is completely removed by simple rinsing.

Cleans "loaded" sand filters, attacking slime at one of its commonest sources.

Stop "messing around." End your slime troubles with MAGNUS SLIME REMOVER.

ASK FOR A BARREL ON 10-DAY TRIAL

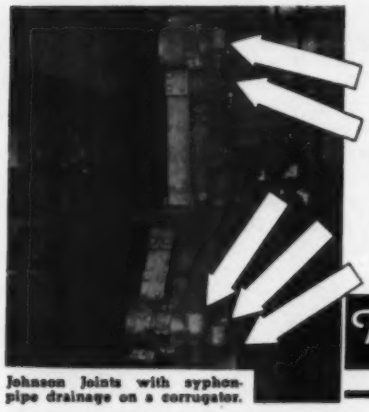
If it does not work out to your complete satisfaction, send back the unused material. We'll gladly give you full credit.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants

192 South Avenue — Garwood, N. J.

MAGNUS CLEANERS



Johnson Joints with syphon-pipe drainage on a corrugator.

A BIG ORDER—*but we filled it!*

● It was our intimate knowledge of the needs of the paper mill that led to the development of the Johnson Rotary Pressure Joint. We knew the troubles that were experienced with the old-time "steam fits"—the frequent repair and replacement; the oiling and adjusting. We knew that operating men would welcome a long-lived, oil-less, self-adjusting, self-aligning joint.

From the standpoint of design it was a large order—but we filled it, and today scores of mills know the difference between the old steam fits that led a short life and a miserable one, as contrasted with this new type that lives a long life and a happy one.

Surely you are taking advantage of this development. If not, write today for the time and dollar-saving details.

Product of The Johnson Corporation

843 WOOD STREET, THREE RIVERS, MICHIGAN

"The present administration has endeavored and is trying to eliminate four hazards which have confronted every individual, namely; injury, old age, unemployment and sickness," said Mr. Plzak. "The social security bill is designed to take care of old age pensions, injury has been pretty well covered by compensation insurance, and unemployment has been covered in unemployment insurance acts. Sickness is next to be considered, and that will be cared for through some form of socialized medicine."

Mr. Plzak warned his listeners to keep an eye on proposed socialized medicine plans which would add further taxation to payrolls and wages, and compared the cost of proposed socialized medicine to the cost of employee benefit associations which already provide medical treatment and hospitalization at a minimum cost to employees.

◆

CUSTOMS CASES

Three cases involving Swedish and Austrian overweight printing paper were abandoned by a New York importer when called for trial in the Customs Court at New York, the importer having originally claimed that a 41-pound paper was duty free as standard newsprint and dutiable as held by Customs officials.

One case in which canary news of 31-pound weight (in ¾-inch rolls, imported from Sweden) was classified for duty but claimed duty free as standard newsprint was abandoned by the importer when called for trial in New York, according to a report from the Import Committee of the American Paper Industry.

The Bureau of Customs has ruled that cores used in shipping standard newsprint are not dutiable. A question arose as to the classification of such cores, in view of the fact that they were separately charged for by many mills although the charge was refunded when the cores were returned. The Customs officials hold that these cores can properly be considered as necessary packing for the duty free newsprint and therefore not dutiable.

◆

PAPER MEN WIN GOLD MEDAL FOR LETTER WRITING

The ability to compose an excellent business letter earned a gold medal for three paper men recently. Russell C. Flom, credit manager of Menasha Products Company; Edgar D. Brooke, director of service of the Duplex Envelope Company, and F. J. Smith, sales manager of Appleford Paper Products, Ltd., all won a Dartnell Gold Medal Award for the letters they submitted in the annual contest.

The Dartnell All-America Gold Medal Award for the best business letters of the year is held annually for the purpose of raising the standards of business correspondence. Executives from all over the country compete, sending in what they consider to be the best business letter they have written during the previous twelve months. The letters written by Messrs. Flom, Brooke and Smith were chosen out of eleven thousand submitted as worthy of high rating.

◆

GAS OVERCOMES CONSOLIDATED MILL WORKERS

Seven employees in the bleach plant of the Wisconsin Rapids division of the Consolidated Water Power and Paper Company were overcome by chlorine gases in January as the result of a freak accident indirectly caused by the weather.

The men were stricken after chlorine fumes, ordinarily directed out of the plant by a large circulating fan, permeated the air in the part of the building in which the men were working. The fan had stopped when a short circuit in high tension wires shut off the electric power. The wire had been broken under the weight of heavy sleet, thus causing a short circuit. The men were able to report to work the next day.

◆

CARRIER FOR EXPLOSIVES WINS AWARDS

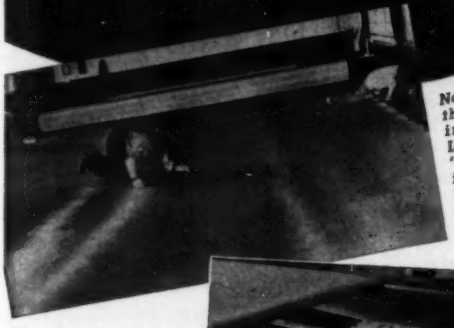
A new explosives carrier, molded of special impact resistant bakelite, won one of the industrial awards in the third annual plastics competition recently completed by *Modern Plastics*. The carrier, a product of the Mine Safety Appliance Company, Pittsburgh, was designed by the company's own research department. Because of the tough, moisture-proof, dielectric shell and sealed-tight cover, this type of explosives carrier makes a convenient, yet strong and safe means, of carrying high explosives.

◆

NEAH BREAKWATER RECOMMENDED BY U. S. ARMY CHIEF

An appropriation of $500,000 for construction of a breakwater at Neah Bay, Washington, was included in rivers and harbor improvements recommended at Washington, D. C., by Major General Julian L. Schley, chief of army engineers. The recommendation has revived hopes of industrial shipping and fishing interest in the vicinity of the proposed breakwater which was given congressional approval last year, but was given no funds in the Rivers and Harbors Appropriation Bill. Neah Bay is the site of a logging camp operated by the Washington Pulp and Paper Company Division of Crown-Zellerbach Corp.

CARE, CARE, AND *More Care!*



No. 1—Down to the very last inch, every Lindsay wire is "cross-examined" mercilessly on the springer table.

No. 2—When a Lindsay wire seam survives this ordeal by microscope, you may count upon its being practically perfect. →

No. 3—On the stretcher, fingers made sensitive by long experience discover and smooth out the slightest irregularities in every wire. ←

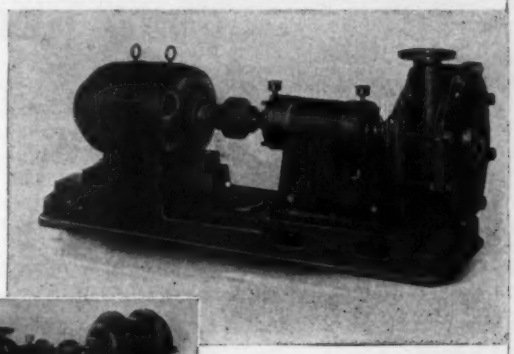
WE GET DOWN ON OUR KNEES TO QUALITY!

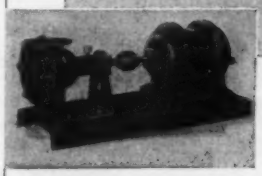
BESIDES metallurgical tests before and after annealing; in addition to elongation tests and diameter and tensile tests before weaving; on top of diameter tests during weaving, we minutely examine every inch of every wire on the springer table (No. 1 above) and every inch of every seam under the microscope (No. 2 above) before finishing (No. 3), which is really still another inspection. Only thus can we be sure that your wires will satisfy Lindsay standards of excellence . . . Yes, we actually get down on our knees to quality.

THE LINDSAY WIRE WEAVING COMPANY
14025 Aspinwall Avenue • • Cleveland, Ohio

Lindsay **WIRES**
FOR PAPER MILLS

WORTHITE PUMPS
for the PAPER INDUSTRY





Type CQ Pumps for heavy-duty work

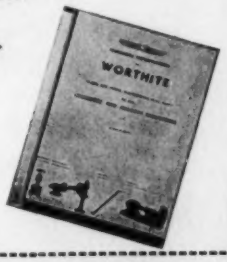
Type CG Pumps for low-duty work

Worthite casting after a cold bend

WORTHITE is a nickel-chromium-molybdenum high-alloy low-carbon steel. Extremely strong and tough...cannot be broken...readily machinable.

A remarkably useful alloy in handling sulphite liquor...also bleach, alum, black liquor, green liquor, white liquor, sodium sulphide, milk of lime, dye liquors, and various extracts and fatty acids encountered in by-products.

Send for this new Bulletin of complete data →



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WORTHINGTON PUMP AND MACHINERY CORPORATION
Publicity Division, HARRISON, NEW JERSEY

Send me "Technical Information on Worthite," Bulletin W-2007

Name _____

Firm _____

Address _____

CPB-18

PERSONALS

MRS. WARNER ELECTED TO SUCCEED HER FATHER

ON the last day of the year 1938, the name of another woman was added to the roster of those who are doing work in the industry that merits special mention. Just before the new year came in, the Board of Directors of the Gulf States Paper Corporation, elected as its president, Mrs. Mildred Westervelt Warner, daughter of its former president, the late H. E. Westervelt, who passed away in September.

It is believed Mrs. Warner is the first woman ever to be elected to the office of president of any paper company. She did not win this honor just because she was her father's daughter, but because from her school days she has shown more than a passing interest in industry and economics. Furthermore, for some several years past, as executive vice-president of the company, her late father relied much upon her counsel and left many important affairs in her trust. Her wisdom in handling these matters won the complete confidence of her company associates and all those with whom she had any business dealings.

Mrs. Warner was born in Mechanicsville, New York. When she was still very young, the family moved to South Bend, Indiana, where they lived during the time she went through the public school. After graduating from high school, she attended LaSell Junior College, near Boston. After a trip to the orient, matrimony sought the school girl and she gave up finishing her university work to become Mrs. Herbert David Warner. At the time they were married, Mr. Warner was a prominent legal figure in South Bend. Shortly afterward, they moved to Decatur, Illinois, to become associated with what was then the E-Z Opener Bag Company. They lived in Decatur until the business of the company was consolidated at the new Tuscaloosa plant, and in 1929 the southern city became the home of the Warner family, which by that time included two sons and two daughters. The older son met with an accidental death in 1931 while vacationing.

Even the responsibilities of looking after a home and three growing children could not keep Mrs. Warner from exerting an extraordinary interest in the business to which her father had devoted his life. To use her own words, "An interest in economics and industrial development has been simply 'bred in my bones' and nourished almost from infancy."

And last but not least, Mrs. Warner works side-by-side with her husband, as he is secretary-treasurer of the corporation. With one common interest, they draw from life a deep satisfaction in pooling their efforts to the furtherance and maintenance of the company founded and built by her father.

Mrs. Mildred Warner, new president of Gulf States Paper Corporation, finds time even on a busy day to look through the company's magazine, "The News Bag."

◆

▶▶▶ Effective January 1, 1939, *James P. Raugh* was appointed general sales manager of the General Refractories Company, Philadelphia, Pa. During the past three years he has been assistant general sales manager. New general works manager for the refractories concern is *Fred M. Miller*, who was formerly connected with the Youngstown Sheet & Tube Company.

◆

R. M. LEA MADE VICE-PRESIDENT OF J-M CORP.

Newly elected a vice-president of the Johns-Manville Corporation is Robert W. Lea, formerly vice-president of the West Virginia Coal and Coke Company. Mr. Lea will be in charge of finance and will take over the position formerly held by Enders M. Voorhees who left J-M to become chairman of the finance committee of the United States Steel Corporation.

Mr. Lea, who will assume his new duties about the end of March, was graduated from the University of Wisconsin in 1907, working first for the Otis Elevator Company and later for the Moline Plow Company. During the World War Mr. Lea served as major and later colonel in the Procurement Division of the United States Army. During 1933 he was administrative assistant of the NRA in Washington following which he was president of the Hammon Lumber Company, San Francisco.

◆

A STAR SALESMAN GETS HIS REWARD

Paying tribute to a star salesman's fifty years of service, sixty salesmen and executives of the Union Bag and Paper Corporation gave a testimonial dinner recently to Sam Alberding, veteran representative of the paper firm. The banquet was given as part of a general sales meeting held at Savannah, Georgia, during the week of December 12 and came as a complete surprise to Mr. Alberding.

For Sale—Paper Machinery

Paper Machines: 72 in., 126 in.
Experimental Fourdrinier Paper Machine with wire 46 in. by 50 ft., 2 presses, Minton vacuum dryer, worn gear drive.
Calender Stacks: 116 in., 114 in., 104 in., 100 in., 90 in., 88 in., 84 in., 76 in.
Super Calenders: 44 in., 72 in., motor driven.
Sheet Cutters: 72 in., 94 in., 108 in., 136 in., duplex with or without layboys; single: 44 in. to 100 in. (20 cutters and layboys).
Slitters: 60 in. Cameron. 60 in. Kidder.
Trimmers: 2-50 in. Seybold.
Dryers: Several hundred, from 42 in. to 100 in. face.
Fourdrinier Part: Late type, Moore & White, takes wire 80 in. by 50 ft., with Voith inlet and suction couch.
Jordans: 3 Jones, 2 Emersons, 2 Appleton.

BEATERS—PUMPS—ROLLS—REEVES DRIVES

Write to us when you want to sell Paper Mill Machinery

FRANK H. DAVIS CO.
175 Richdale Avenue, Cambridge, Massachusetts

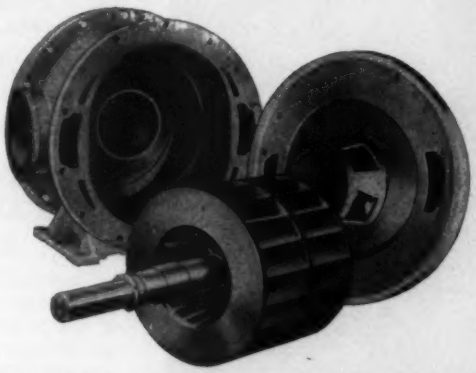
TRIMBEY MACHINE WORKS
GLENS FALLS, N. Y.

Knotters — Pulp Screens — Float Valves — Consistency Regulators —Weight Regulators—Color and Alum Meters—Metering Systems

THE TRADE-MARK OF GOOD FELTS

The Waterbury Felt Co.
SKANEATELES FALLS, N. Y.

SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

Facts About Accidents in the Paper & Pulp Industry

Interesting and Valuable!

What were the outstanding facts about accidents in the Paper & Pulp Industry during 1937? How did they compare with other industries? How did your plant's record compare with others?

These and many other revealing and important data are presented in detail in "1937 Accident Rates In the Paper & Pulp Industry", recently published by the National Safety Council. We'll be glad to send a copy FREE to any Safety Director or other plant executive upon request. Simply drop us a line on company letterhead.

Contents . .

Outstanding Facts
Comparison with other Industries
Experience by Type of Industry
Experience in various types of Mills
Experience in various Departments
Causes of Serious Accidents
Disabling Injuries by Industrial Groups
Types of Accidents
Best All-Time Records
Individual Plant Records

PAPER & PULP SECTION NATIONAL SAFETY COUNCIL TWENTY NORTH WACKER DRIVE CHICAGO ILL.

Sam Alberding

During the course of the festivities a gold watch, suitably engraved, was presented to Mr. Alberding by Alexander Calder, president of the corporation. Behind the speakers' table and enlarged to five-foot size was a photograph of the guest of honor looking out at his fellow diners. Even the menu cards were adorned with Mr. Alberding's likeness.

Twenty years prior to the turn of the last century, Mr. Alberding was attending school in Batavia, Illinois, working during the summer in the bag factory of the Western Paper Bag Company. When he left school he became a regular employee of this company, one of the early firms which eventually made up the present day Union Bag and Paper Corporation. Mr. Alberding was in charge of the Western Paper Bag Company's exhibit at the Columbia Exposition of 1893, and it was in connection with his duties there that he entered the selling profession. Oddly enough, Mr. Alberding's company had neglected to tell him the price of the machine which was on exhibition so after journeying to Batavia and back again to the exposition in order to ascertain the price, Mr. Alberding began negotiating sales. He has been selling ever since.

In 1899 the Western Paper Bag Company, along with the Wheeler-Fisher Company, Samuel Cupples Woodenware Company, Chatfield & Woods, D. S. Walton and Hollingsworth & Whitney, in addition to others, formed the Union Bag and Paper Company. Mr. Alberding was given a place with the Wheeler-Fisher organization which retained its status as agent of the newly-formed manufacturer.

Those present at the banquet, in addition to Mr. Calder, were H. S. Daniels, vice-president in charge of sales; James H. Allen, vice-president and resident director; L. J. Doyle, general sales manager, and B. A. Weathers, Western sales manager. Some of the older salesmen, connected with Mr. Alberding more closely in the Chicago office, were also on hand to offer him their congratulations.

◆

SAVANNAH MAYOR HEADS SOUTHERN FESTIVAL ASS'N

Thomas Gamble, mayor of Savannah, Georgia, became the first president of the Southern Paper Festival Association when the board of directors voted that the mayor of that city should automatically be president of the Association.

Mr. Gamble has, for more than a quarter of a century, been one of the South's civic leaders and business executives and is now serving his third term as mayor of Savannah. His fame as a writer of civic, historical and business articles is international, many of his writings having been translated and reproduced in publications of other nations.

Other officers elected at the Association's board of director's meeting included: E. George Butler and Martin T. Price, vice-presidents; Julian A. Space, treasurer, and Alex Cassels, secretary. The Association is arranging the First Annual Paper Festival which will be held April 17-19 in Savannah (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 939, Dec. 1938).

Mayor Thomas Gamble

Close-ups

A SCOTCHMAN GOES HOME

The old adage, "Age is only a state of mind," is fully epitomized by Archibald A. Brooks, who on January 17 celebrated his seventy-sixth birthday, and who this year is rounding out fifty-eight years as an employee of the Sinclair Wire Company, Holyoke, Massachusetts, where one of the main products is dandy rolls for paper mills.

Archibald A. Brooks

Mr. Brooks, a native of Scotland, came to Holyoke in 1882. His first job (his only position in all these years) was with the Buchanan Bolt & Wire Company. When that company was sold to Peter Sinclair after the World War, Mr. Brooks remained at his wire loom. Despite his years, this remarkable gentleman has perfect eyesight and a hand as steady as that of a surgeon.

Some might say that Mr. Brooks acquired particular skill in handling his wire loom by its rhythm to that of music. One of his favorite tunes, of course, is "Loch Lomond." But a change in tempo which swung into this old song about a year ago interfered with the rhythm of the loom and last summer to the old and beloved strain of "Oh ye'll take the high-road and I'll take the low-road, and I'll be in Scotland afore ye," he climbed aboard the Steamship Cynthia, "because I just had to see Scotland again," he said. According to him, his greatest thrill while there was in paying a visit to the small company in Glasgow where he worked as a clerk before coming to America.

Mr. Brooks, true Scot that he is, has one hobby—golf, and he shoots in the low 80's.

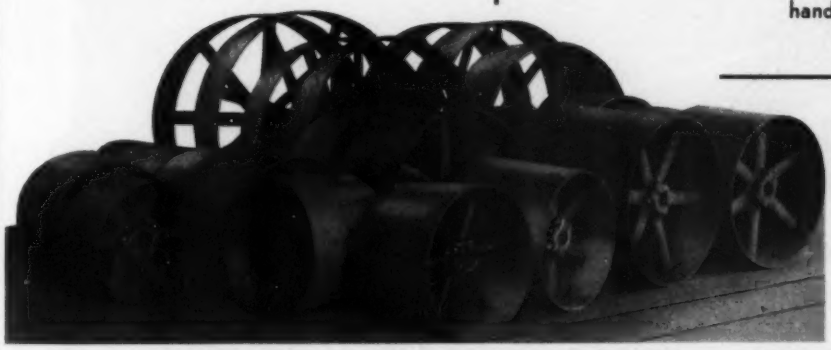
A WOOD'S PULLEY FOR EVERY PAPER MILL DRIVE

Cast Iron for Rigidity and Better Performance under Paper Mill Conditions.

For prompt delivery of pulleys of all types and sizes, phone or wire T. B. WOOD'S. WOOD'S Pulleys are machine-moulded, precision machined, then rigorously tested for accuracy . . . have every advantage in their start in life that a maker of over 80 years' experience can give them.

You'll find them accurately balanced, truer-running and power thrifty.

Catalog on request. Keep it handy in your files.



T. B. WOOD'S SONS CO.

CHAMBERSBURG, PA.

50 Church St., New York City
387-391 Atlantic Avenue, Boston
MEMBER: Power Transmission Council

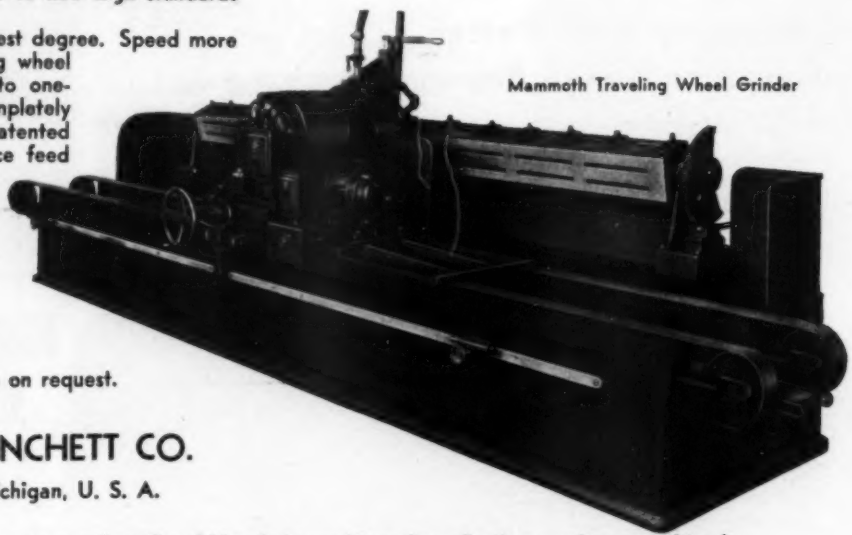
APPLETON WIRES ARE GOOD WIRES

• KNIFE GRINDING •

Advanced Constructions • Complete Coverage • Longest in Service • Most Widely Adopted

The most widely employed grinder for paper knives, doctor blades and similar service, in nearly every paper mill, the favorite for 25 years, and now brought to new high standards of perfection.

Accurate to the highest degree. Speed more than doubled. Grinding wheel expense cut one-third to one-half. Carriage ways completely covered with new patented way-cover system. Force feed automatic lubrication. Grinding wheel spindle precision built, frictionless dust proof bearings.



Mammoth Traveling Wheel Grinder

Catalogue on request.

COVEL-HANCHETT CO.

Big Rapids, Michigan, U. S. A.

More knives are ground on Covel-Hanchett machines than all other machines combined.

▶▶▶ Succeeding the late Thomas A. Weldon as a member of the board of directors of the Interlake Tissue Mills Company, Ltd., is *George L. Carruthers,* who has been with the company for many years.

◆

▶▶▶ *William P. Good,* executive secretary of the American Pulpwood Association, has resigned his position to accept a new position with Price Brothers of Canada.

◆

▶▶▶ *Dr. J. P. Hagenauer* has severed his connection as director and mill manager of the Elk Paper Manufacturing Company and has resumed his practice as paper mill consultant in Elkton, Maryland.

◆

SHIFT PERSONNEL AT A.W.P. CORP.

The American Writing Paper Corporation of Holyoke, Mass., has made several changes in personnel recently, according to an announcement by Peter Freedman, comptroller.

Rufus D. W. Ewing, vice-president of the corporation, has been assigned to new duties in the administrative department as assistant to the chairman of the board of directors. A re-assignment of the duties of the sales staff has been made necessary by this change and J. H. Sweet has consequently been appointed field sales manager, directing sales efforts of salesmen selling to the paper merchant trade.

In addition it has been announced that Fred A. Curtis has been appointed field sales manager, directing the efforts of the salesmen selling industrial, technical and converting papers. W. J. LaCrosse is being moved from the Chicago office to take over the position of sales office manager. The direction of sales and advertising is in charge of Russell S. Madden as before.

◆

▶▶▶ For the last twenty-seven years associated with Johns-Manville in the Chicago office, *William H. Fogarty* is now assistant to the vice-president of the J-M Sales Corporation. In his new position, Mr. Fogarty will continue to make his headquarters in Chicago. He will be succeeded as district manager by *Corydon H. Hall,* formerly associated with J-M's New York power products division.

◆

▶▶▶ *General Manager H. G. Welsford* of the Dominion Engineering Works, Ltd., was recently elected vice-president and director of the company.

MRS. KILEY NOW IND. NURSE AT CONSOLIDATED

Appointment of Mrs. Olive Lewis Kiley, registered nurse, as industrial nurse of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wisconsin, has been announced by Claims Manager J. J. Plzak. Mrs. Kiley succeeds Miss Phoebe Brown, who was recently presented with a plaque by the Consolidated Foremen's Club when she left to accept another position.

Mrs. Kiley is a graduate of Michael Reese Hospital, Chicago, and has taken a special course in industrial nursing and medical secretary work at Marquette University. At Consolidated she now has charge of the first aid departments at both Wisconsin Rapids and Biron divisions of the company.

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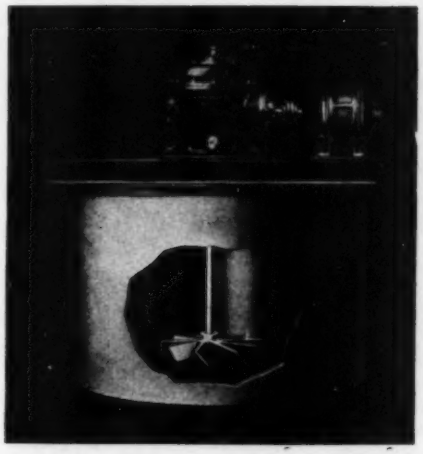
▶▶▶ Two promotions in the engineering department of the Falk Corporation, Milwaukee, were announced recently by the equipment firm. *Louis W. Falk* is now executive engineer and *W. P. Schmitter* is chief engineer. *Harold S. Falk,* vice-president, continues in his present capacity as director of engineering.

"NEW ENGLAND" AGITATORS in Paper Mills–



1. Speed up clay mixing–

In one mill, using slow moving paddle type stirrers, density of samples varied widely. After installing "New England" Agitators, with turbine type stirrers, a 3000 lb. load of clay is so thoroughly mixed in 10 minutes that samples vary in density less than 1% from the desired mix.

2. Improve stuff chest agitation –

Results from the use of New England Agitators, in stuff chests carrying 3% to 4% stock, have made many users enthusiastic; claiming more efficient mixing and more uniform mix.

■

Successful agitation requires correctly designed equipment PLUS the judgment of Engineers who have specialized in paper mill mixing problems for many years. For quotation on your next requirements—or for Bulletin 380—address,

NEW ENGLAND TANK & TOWER CO.
81 TILESTON STREET, EVERETT, MASS.
NEW YORK OFFICE - 11 WEST 42nd STREET

FEEDING directly into the Mount Pleasant mains under pressure, goes another million gallons of pure cold water from the third Layne Gravel Wall Well and high efficiency Layne Vertical Turbine Pump.

More than ten years ago, that thriving little Michigan city bought its first Layne Well and Pump. As their needs for water increased, they bought a second unit. Now the third one is in operation. Such repetition of orders can only denote their experience in satisfaction for which Layne Well Water Systems are world-wide famous.

AFFILIATED COMPANIES

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LAYNE-ATLANTIC CO. . . . NORFOLK, VA.
LAYNE-CENTRAL CO. . . MEMPHIS, TENN.
LAYNE-NORTHERN CO. . MISHAWAKA, IND.
LAYNE-LOUISIANA CO. LAKE CHARLES, LA.
LAYNE-NEW YORK CO. . NEW YORK CITY, AND PITTSBURGH . . . . . PA.
LAYNE-NORTHWEST CO. MILWAUKEE, WIS.
LAYNE-OHIO CO. . . . COLUMBUS, OHIO.
LAYNE-TEXAS CO. . . . HOUSTON AND DALLAS . . . . . TEXAS.
LAYNE-WESTERN CO., KANSAS CITY, MO. CHICAGO, ILL., MINNEAPOLIS, MINN. AND OMAHA . . . . . NEBRASKA.
LAYNE-BOWLER NEW ENGLAND COMPANY, BOSTON . . . . . MASSACHUSETTS.
INTERNATIONAL WATER SUPPLY, LTD., LONDON . . . . . ONTARIO, CANADA

All installations were made by the Layne-Northern Company of Mishawaka, Indiana—one of the many Layne & Bowler, Inc. affiliated companies that dot the map from Canada to Mexico.

While Layne Wells and Pumps serve the largest cities and industries, they are also used by many small towns and manufacturing plants.

For complete information on our services, our methods of locating and drilling for water and the kind of pumps and equipment we install, write

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LAYNE

PUMPS & WELL WATER SYSTEMS
For Municipalities, Industries, Railroads, Mines and Irrigation

NECROLOGY

JOHN J. CLARK

Widely known throughout the industry by reason of his work as assistant editor of the five-volume text book, *The Manufacture of Pulp and Paper*, John Jesse Clark passed away January 17 in Lachine, Quebec. He was 73 years of age and had just completed the third edition of this well-known work before he died.

Mr. Clark was a graduate of Lehigh University and was connected with the coal mining industry as a civil engineer prior to his interest in papermaking. He was formerly dean of the International Correspondence Schools and was vice-principal of the Institute of Industrial Arts which has conducted, since 1922, a course in pulp and papermaking in co-operation with the Canadian Pulp and Paper Association. Mr. Clark began his work on the pulp and paper text books twenty years ago.

Survivors of Mr. Clark include a son and a daughter, his wife having passed away twelve years ago.

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CARL F. LOMB

Carl F. Lomb, vice-president of the Bausch & Lomb Optical Company, passed away January 26 at his home in Rochester, New York. He was 83 years of age.

Born at Birstein, Hesse Cassel, Germany, in 1854, Mr. Lomb came to the United States in 1873 and was admitted to citizenship in 1879. He was first associated with the banking house of Jay Cooke & Company of New York city, later joining the First National Bank of New York.

Carl F. Lomb

In 1874 Mr. Lomb became associated with the New York office of Bausch & Lomb and in 1875 he came to Rochester to aid in the formation of the Rochester German Insurance Company. He returned to his work with B. & L. in 1877 where his training in finance brought him continuous advancement. He became secretary in 1882 and vice-president in 1909.

Like his famous cousin, Captain Henry Lomb, Mr. Lomb had many worthy outside interests. He was elected to the board of directors of Mechanics Institute and in 1916 became its president. He was one of the organizers of the Better Citizenship Council of the Chamber of Commerce and served as chairman of the group. He was also instrumental in the establishment of the physics building at the University of Rochester and in addition, created the Lomb Memorial Park and the Lomb Monument which are dedicated to Captain Henry Lomb. No immediate family survives Mr. Lomb.

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▶▶▶ *Percy E. Iago,* formerly associated with the Consolidated Paper Corporation as accountant, passed away January 1 after a two-month illness. His widow survives him.

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▶▶▶ *Professor Ralph C. Bryant,* a former president of the Society of American Foresters and a member of the faculty of Yale University's School of Forestry, passed away February 1. Professor Bryant was the first graduate of Cornell University's College of Forestry. He was a grandnephew of William Cullen Bryant, the poet and editor.

◆

WM. P. BRADBURY

Associated with Manning, Maxwell & Moore, Bridgeport, Connecticut, since 1902, William P. Bradbury, vice-president and general sales manager of the company's Consolidated Ashcroft Hancock Division, passed away January 14 after a six-day illness. He was 53 years of age.

Joining Manning, Maxwell & Moore as an office boy, Mr. Bradbury advanced step by step through various positions in the sales department.

William P. Bradbury

These positions took Mr. Bradbury to every part of the United States and some foreign countries. In 1923 Mr. Bradbury was made general sales manager and in 1930, vice-president in charge of sales, which position he held until his recent death. Mr. Bradbury had thousands of friends in every branch of American industry who will be grieved to learn of his passing.

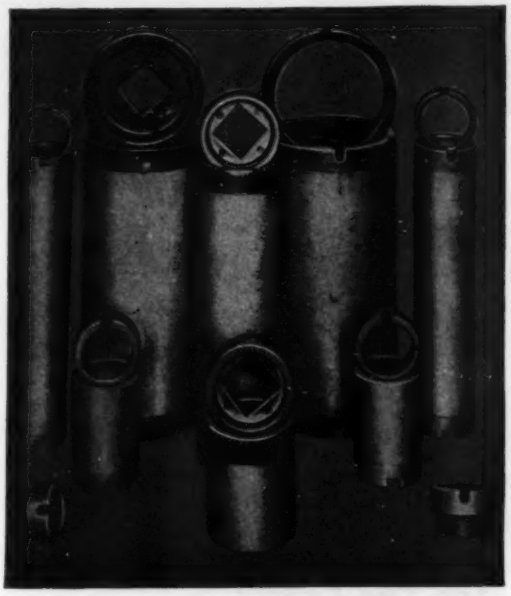
◆

JOHN W. BOLTON

John W. Bolton, widely-known in the pulp and paper industry as the president and founder of John W. Bolton and Sons, Inc., passed away January 7 at the age of 79. He was residing at his Petersburg (Florida) home at the time of his death.

Mr. Bolton's entire life was devoted to the interest of the pulp and paper industry. Since he was a young man he had been connected with the manufacture of knives for, and the manufacture of machinery used in, papermaking. His first connection with the industry was with J. H. Horne and Sons, Lawrence, Mass. In 1904 Mr. Bolton started in business for himself making a specialty of the manufacture of a complete line of high grade knives for use in all of the different machines used in the paper industry.

From a small factory Mr. Bolton built up a large, well-known industry, which was broadened in 1927 by the acquisition of the Emerson Manufacturing Company, the Dillon Machine Company and the Mill Machine Company. He was active as president until the first of the year and the business will continue to be conducted by his sons, W. W. Bolton and A. L. Bolton, vice-president and treasurer respectively.



ELIXMAN

CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with re-enforced square hole. This patented feature of re-enforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted.

ELIXMAN PAPER CORE COMPANY, Inc.
CORINTH, N. Y.

729,290 Tons Annually (2,330 Tons Daily) of Southern Kraft Pulp

Screened clean by 22 APMEW knotters (Each 105 tons daily driven by ONE H.P. Motor) and 28 APMEW Screens (First Screens each handling 105 tons daily using 35 H.P.) in new Kraft Mills of the South.

CLEAN PULP IS BEING PRODUCED—WITH GREAT EFFICIENCY by Centrifugal Separation Principle and Inward Flow Screening.

TEN CENTS per ton pays for these 22 APMEW Knotters and 28 APMEW Screens in one year. SAVINGS in power, labor, maintenance, repairs, etc.; usually repay the investment in less than one year, and thereafter makes good earnings.

AMERICAN PAPER MACHINERY & ENGINEERING WORKS, Inc.
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Chemical Pulping Processes ☆ Operating Surveys
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Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

PULP AND PAPER MILLS
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STRUCTURES

"NON-USERS ARE THE LOSERS"

TENAX FELTS

FINISH AND TRIM

Among APPA Friends

Gratifying when we check the membership of the American Paper and Pulp Association to note the large number using TENAX FELTS. That's no happenstance! Steadily through the years, their use has increased as their reputation for Low Operating Costs and Better Finish has spread from mill to mill.

"Non-Users Are The Losers"

LOCKPORT FELT COMPANY

NEWFANE, N. Y.—U. S. A.

JUSTUS C. SANBURN

Well-known throughout the pulp and paper industry in his capacity of technical director and secretary of the Strathmore Paper Company, West Springfield, Massachusetts, and by virtue of his many valuable contributions to the industry, Justus C. Sanburn passed away January 15 after a short illness.

Justus C. Sanburn

Mr. Sanburn was born in 1890 in Thomson, Illinois, attended the Massachusetts Institute of Technology and upon his graduation from that institution in 1912, became associated with the Strathmore firm.

Mr. Sanburn devised one of the first accurate methods of fiber counting and co-operated with the Bureau of Standards in establishing weight factors for use in fiber analysis. He saw the potential values of titanium oxide and as a result Strathmore was the first mill to employ this agent as a opacifying agent. In addition he adapted a Weston sight meter to measure opacity, finding that there existed a nearly straight-line ration between foot-candle readings and the per cent opacity by contrast ratio of white papers. Mr. Sanburn is also credited with originating and putting into use color standards made from an extract of oak leaves.

Surviving Mr. Sanburn are his widow, a son, a daughter and his mother.

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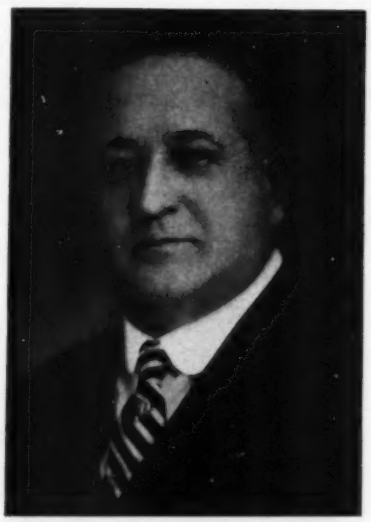
R. A. NORTH

A familiar figure in paper mill circles for nearly a half-century, R. A. North, president of the Green Bay Foundry and Machine Works, Green Bay, Wisconsin, passed away January 19 at the age of 66.



Ray North

Mr. North had made his home in Green Bay for 25 years, and for 15 years previous to that time he had been associated with the R. J. Dowd Company at Beloit, Wisconsin. He was the inventor of various mill machines on which he held patents, and was also well known throughout the country as a manufacturer of mill machinery and foundry supplies. His widow and one son survive him.

BETTER AND BETTER SERVICE ON

Caustic Soda *Liquid Chlorine*

Consult our experienced Technical Experts on problems pertaining to the Pulp and Paper Industry. They have helped some of the largest and many smaller mills to save money, solve problems and produce better products.

Learn what Hooker has done for others—see what Hooker can do for you.

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Eastern Sales Offices: Lincoln Bldg., New York City. Works, Niagara Falls, N. Y.
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BLEACHING POWDER MURIATIC ACID AND SOLVENTS INSECTICIDES
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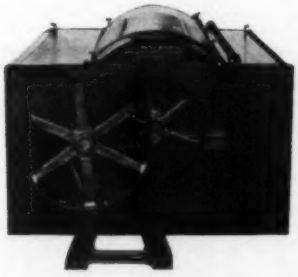
8650

The A. D. Wood Machine

PULP THICKENER — WASHER — SAVEALL
and WATER SCREEN

No Couch Roll or Doctor. Handles variable flows and consistencies. Equipped with patented Double Sealing Collars. Rubber covered or stainless steel construction. Efficient, economical and practically automatic.

Over 30 installed in 1937.



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GLENS FALLS, N. Y.

Ask for descriptive Bulletin

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Neenah, Wisconsin

Builders of

Paper Making Rolls and Special Machinery
Roll Grinding a Specialty

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the complete report of the A. P. P. A. Annual Meeting in the March issue of

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BRICK AND CONCRETE CHIMNEYS

New Catalogues and Publications

American Monorail Co., Cleveland, Ohio —A new 48-page booklet showing how many handling problems have been solved by use of the company's material handling equipment has been released lately by this firm. The booklet contains many interesting photographs of the overhead equipment in use in addition to written and graphic descriptions of all structural features of the equipment. The equipment's use in all types of industry, including the paper industry, is brought out by extensive use of photographs.

Bacharach Industrial Instrument Co., Pittsburgh, Pa.—A new bulletin (No. 274) on this company's "Premax" pressure indicator has been issued recently by this firm. This indicator, built to meet field service and shop needs, is described in the bulletin as having easily read micrometer scales calibrated from 50 to 1500 pound/square inch in two pound divisions. The bulletin shows the indicator in use and also reveals its construction and working principles.

Carbide and Carbon Chemicals Corp. (Div. of Union Carbide and Carbon Corp.), New York, N. Y.—A new 4-page folder on "Octyl Alcohol—Anti-Foaming Agent," has just been published by this organization. The folder summarizes the use of octyl alcohol as an anti-foaming agent in a variety of applications including paper. The publication presents the important physical and chemical properties of the substance.

Chicago Electric Co., Chicago, Ill.—This company has recently issued a new catalogue listing the rebuilt electrical and power equipment the firm is offering. The catalogue contains thousands of listings of alternating and direct current constant and adjustable speed motors ranging in size from 1 hp. to 1,000 hp. motor generator sets, alternating and direct current generators, steam turbine and engine generator sets and other electrical and power equipment.

Colonial Alloys Co., Philadelphia, Pa. —Complete bulletins on "Colalloy," a nonferrous silvery metal two-thirds lighter than steel and most metals, have been issued recently by this firm. The bulletins describe the metal as being resistant to corrosion, outstanding in electrical and thermal conductivity and low in cost. Technical information and specific data for individual uses may be had upon request to the company.

General Electric Co., Schenectady, N. Y. —An attractive bulletin which answers many questions about metal enclosed switchgear has been put out by this firm. The bulletin (GEA-2872) describes the different types of switchgear pointing out the construction features and usages. The 23-page release contains many photographs and much written material which should be of interest to every plant operator.

Haynes Stellite Co., Kokomo, Ind.—A new folder containing valuable information on sizes, weights, limits and prices of "Hastelloy" alloy castings, hot rolled sheets and plates and bar stock, has just been published by this firm, a unit of the Union Carbide and Carbon Corporation.

Leeds & Northrup Co., Philadelphia, Pa.—A very complete new catalogue on this company's "Micromax" condensate purity instruments for the steam plant has just been published by this firm. The 20-page bulletin (No. 95-163), shows how a knowledge of condensate conditions helps to effect important operating economies and it also describes and illustrates "Micromax" recorders, which automatically draw a chart record of condensate conditions. Much data and specific information is included in this publication in addition to the interesting colored reproductions of the instruments and chart records.

Master Builders Co., Cleveland, Ohio— A new folder describing a new method of coloring concrete floors has been published recently by this company. The method, known as the Colormix-Kuro-Krome Method, is explained clearly and there are several pictures showing the various ways the method can be applied.

Mixing Equipment Co., Inc., Rochester, N. Y.—An interesting bulletin on this company's "Lightnin" portable mixers has been released lately by this firm. The bulletin gives complete data on the company's gear drive models, direct drive models and accessories. Specification tables, drawings and photographs aid the written material in presenting to the reader a clear idea of the construction, designs and uses of the portable mixers.

New York Belting & Packing Co., Passaic, N. J.—An interesting 24-page "Hose Data Book" which contains many valuable facts relative to industrial hose has been issued recently by this firm. This well-written and profusely-illustrated publication covers such pertinent subjects as suggestions for increasing service life of hose, fundamental terms and their relationship to hose structures, principal types of hose construction, etc. There is also, in addition to these, a chapter on couplings and a separate frictional pressure drop and flow chart which can be used to determine friction loss, maximum flow, pressure necessary for desired flow and size of hose necessary to deliver a desired volume.

Philadelphia Quartz Co., Philadelphia, Pa.—An interesting bulletin on the use of silicate of soda in the coating of paperboard has been released lately by this company. The bulletin, in presenting this subject, covers such points as coating materials, grades of silicate, moisture-resistance, grease-proofing, application of coating, ventilation and quantities to use. A typical outline installation for continuous coating is included in the release.

Quigley Company, Inc., New York, N. Y.—"Hytempite," a plastic, air-setting, high-temperature cement for bonding refractory bricks and shapes, is described in a new bulletin (H.G.501) recently put out by this company. The bulletin contains many photographs and much descriptive written material relative to the features and usages of the product. Other refractory materials are also described in this release.

RLM Standards Institute, Inc., Chicago, Ill.—A review of the basic principles underlying modern industrial lighting, including complete specifications for the four types of lighting reflectors for which RLM standards have been established, is found in a new booklet recently published by this organization. The booklet explains the various tests conducted by this organization relative to industrial lighting equipment and lighting principles.

U. S. Department of Commerce, Bureau of the Census, Washington, D. C.—A census survey of business for 1937-38 showing wholesale distribution has been issued by this government agency. The bulletin shows net sales by quarters of the various businesses and includes in various tables the sales, payrolls and stocks of different industries.

Vulcan Iron Works Co., Denver, Colo.— The new Dolmar bow saw, which may be driven by AC or DC electric motors or by a gasoline motor, is the subject of a recent circular put out by this company. The release contains several illustrations of the saw together with descriptive literature which points out various features of the product.

Whirlfix Sales, Inc., Buffalo, N. Y.— A new bulletin, pointing out the economies effected by use of this company's mechanical cleaner, has been issued recently by this firm. The bulletin, written in clear and concise language, explains the construction and usages of the apparatus and points out the advantages in having all traces of dirt, scale and rotted stock accumulation eliminated from pipe lines and systems. Various features of the cleaner are shown and explained.

Worthington Pump and Machinery Corp., Harrison, N. J.—This company's deep well turbine pump, types QE and QAE, are described in a recent bulletin (W-450-B19C) distributed by this firm. Several photographs and two cross-sectional drawings are included in the release.

Wright Austin Co., Detroit, Mich.—A new folder issued by this firm describes and illustrates the company's Neon water gauge illuminator. The folder presents the complete picture of how the illuminator is attached and how it is constructed. Various features of the product are explained in detail.

Yarnall-Waring Co., Philadelphia, Pa. —Blow-off valves for high pressure boilers are fully described and illustrated in a new 22-page catalogue recently put out by this company. Using photographs and drawings to good advantage the bulletin contains a wealth of data relative to the various types of blow-off valves for working steam pressures from 400 to 2,500 pounds. The bulletin (B-430) contains price lists and size tables in addition to much detailed matter concerning the construction and usages of the valves.

BOOKS

The James F. Lincoln Arc Welding Foundation—109 of the more important papers submitted in the James F. Lincoln Arc Welding Foundation Award Program have been combined in book form and are now ready for distribution. The new book provides a compilation of studies which should be of much use to scientific and technical schools, universities, engineering bodies as well as industrial executives and officials. The papers reproduced contain designs and explanations for the efficient use of arc welding in manufacture. The book is divided into ten sections as follows: automotive, aircraft, railroad, watercraft, structural, furniture and fixtures, job welding, containers, machinery and jigs and fixtures. About 600 illustrations are contained in the book which is of convenient desk size, approximately 6 by 9 inches with a flexible simulated leather cover. The book is priced at $1.50 postage prepaid anywhere in the United States, $2.00 elsewhere.

Profitable Showmanship—Zenn Kaufman and Kenneth Goode, those master showmen, have just written a new book. Those who read their first book *Showmanship in Business*, will certainly want to read this latest treatise on the specific application of dramatics to advertising and selling. This volume brims over with ideas that appeal to everyone whether he be engaged in advertising, selling, or private enterprise. The authors really point out that everyone is a salesman, hence everyone should be a showman. One incident after another is cited, each of which has a timely lesson in putting your subject across. Anyone who is confronted with executive problems, sales obstacles, or personal frustration, will certainly find some workable ideas in this book that may help solve their difficulties. Prentice-Hall, 70 Fifth Avenue, New York City, are the publishers, and the price is $2.75.

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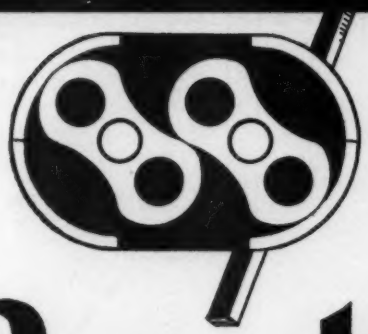

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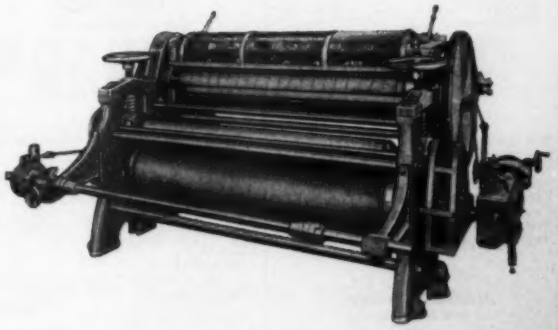

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	per cwt.
Blue Overalls	4.75 to 5.00
Cordurov	2.25 to 2.50
Cottons—	
Washables, No. 1	1.60 to 1.75
Fancy Percales	3.00 to 3.25
New Soft Blacks	3.50 to 3.75
New Light Seconds	1.60 to 1.75
New Dark Seconds	1.50 to 1.60
Khaki Cuttings—	
Mixed	3.00 to 3.25
O. D.	3.50 to 3.75
New Canvas	7.00 to 7.25
New Mixed Blacks	2.25 to 2.50
Shirt Cuttings—	
New White No. 1	6.75 to 7.00
Silesias No. 1	4.50 to 4.75
New Unbleached	6.50 to 6.75
Fancy	1.85 to 2.00

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	1.15 to 1.20
No. 2	.90 to .95
No. 3	.80 to .85
Twos and Blues—	
Repacked	1.35 to 1.50
Thirds and Blues—	
Repacked	1.15 to 1.25
Miscellaneous	1.00 to 1.10
White, No. 1—	
Repacked	3.00 to 3.25
Miscellaneous	2.25 to 2.50
White, No. 2—	
Repacked	1.75 to 2.00
Miscellaneous	1.25 to 1.50

RAGS (Foreign)
ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	2.25 to 2.50
New Mixed Cuttings	2.00 to 2.25
New Light Silesias	4.25 to 4.50
Light Flannelettes	4.50 to 4.75
Unbleached Cuttings	6.75 to 7.00
New White Cuttings	7.00 to 7.25
New Light Oxfords	4.00 to 4.25
New Light Prints	2.75 to 3.00

RAGS (Foreign)
ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	7.00 to 7.25
No. 2 White Linens	6.00 to 6.25
No. 3 White Linens	4.25 to 4.50
No. 4 White Linens	3.00 to 3.25
No. 1 White Cottons	3.75 to 4.00
No. 2 White Cottons	3.25 to 3.50
No. 3 White Cottons	2.50 to 2.75
No. 4 White Cottons	2.00 to 2.25
Extra Light Prints	2.25 to 2.50
Ord. Light Prints	1.75 to 2.00
Med. Light Prints	1.70 to 1.80
Dutch Blue Cottons	2.00 to 2.25
French Blue Cottons	2.25 to 2.50
French Blue Linens	2.50 to 2.75
Checks and Blues	1.75 to 2.00
Linsey Garments	1.50 to 1.60
Dark Cottons	1.15 to 1.25
Old Shopperies	1.00 to 1.10

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	1.90 to 2.00
Domestic	1.70 to 1.80
Wool Tares—	
Light	1.60 to 1.70
Heavy	1.80 to 1.90
Bright Bagging	1.50 to 1.60
Manila Rope—	
Foreign	2.65 to 2.85
Domestic	2.90 to 3.00
New Burlap Cuttings	2.20 to 2.35
Jute Threads—	
Foreign	2.75 to 3.00
Domestic	2.75 to 3.00
Strings—	
Sisal	1.65 to 1.75
Soft jute	1.90 to 2.00
Mixed	.80 to .70

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	2.30 to 2.50
Ord. Hard White No. 1	1.75 to 2.00
Ord. Soft White No. 1	1.60 to 1.75
Flat Stock—	
Stitchless	.75 to .80
Overissue Mags	.65 to .70
Solid Flat Book	.55 to .60
Crumpled No. 1	.45 to .50
Solid Ledger Books	1.30 to 1.40
Ledger Stock—	
White	1.10 to 1.20
Colored	.70 to .80
New B. B. Chips	.12½ to .17½
Manilas—	
New Env. Cuts	1.50 to 1.60
New Cuttings	1.30 to 1.40
Sulphite Wrappers	.22½ to .27½
Bogus Wrappers	.15 to .17½
No. 1 Old Kraft	.50 to .60
News—	
No. 1 Wh. News Cuttings	1.20 to 1.25
Strictly Overissue	.40 to .45
Strictly Folded	.27½ to .32½
No. 1 Mixed Paper	.12½ to .17½

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.40 -
Ground, cwt.	3.15 -
Powdered, cwt.	3.55 -
Blanc Fixe—	
Bulk, ton	40.00 to 45.00
Barrels, pound	.0350 to .0375
Bleaching Powder—	
Drums, cwt.	2.00 to 2.25
Casein (Domestic Standard)—	
Ground (bags), lb.	8.50 to 9.00
Fine grd. (bags), lb.	9.50 to 10.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	6.50 to 12.00
Domestic Coating	
Bulk (mine) ton	11.00 to 20.00
Imported (ship side)	
Bulk (lump) ton	14.50 to 24.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.55
Gelatine (silicin) lb.	.38 to .44
Glye. (C.P.) drums, lb.	.1250 to .1300
Litharge, powd., bbl., lb.	.07 to .0725
Rosin (Gum)—	
New York, 280 lb. barrel	
E, per bbl.	5.35
F, per bbl.	5.65
G, per bbl.	6.40
WW, per bbl.	8.25
Rosin (Wood), per bbl., carlots	4.00 to 5.05
Salt Cake—	
Dom. bulk (wks) ton	12.00 to 13.50
Imp. bulk on dock—	
(Atl. ports) ton	14.50 to 15.00
Soda Ash—	
Bulk (works) cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.00 to 2.25
Ground and flake, drums, cwt.	2.40 to 2.60
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.60 -
Pearl, barrels, cwt.	2.85 -
Paper (Sp.) bags, cwt.	2.70 -
barrels, cwt.	2.95 -
Sulphur (crude)—	
(mine) bulk, ton	16.00 to 19.00
Talc—	
Dom. 100 lb. bags (mine) ton	14.00 to 18.00
Imp. bulk, ton	25.00 to 40.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05½ to .06½
Calcium Pig., bbls., lb.	.05½ to .06½
Zinc Sulphide, bbls., lb.	.09 to .095

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached	2.55 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	2.25 to 2.75
Kraft No. 1	1.75 to 2.00
Kraft, Southern, del.	1.40 to 1.65
Sulphate (Imp.) on dock—	
Bleached	2.25 to 2.75
Kraft No. 1	1.50 to 1.65
Kraft No. 2	1.40 to 1.50
Sulphite (Dom. & For.) On dock—	
Prime bleached	2.35 to 2.50
Prime easy bleach	2.00 to 2.15
Prime strong unbl.	1.75 to 1.90

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. mill)	19.00 to 22.00
No. 1 Imp. (On dock)—	
Moist	24.00 to 25.00
Dry	22.50 to 24.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	71.00 to 77.00
Chip	27.50 to 30.00
Chip, sgl. mla. lined	42.50 to 45.00
Coated, white patent .016	60.00 -
.020 and heavier	55.00 -
Kraft liner	42.50 to 45.00
News	27.50 to 30.00

	per cwt.
Book (coated)—	
No. 1 Glossy Coat	10.50 to 12.50
No. 2 Glossy Coat	9.25 to 10.75
No. 3 Glossy Coat	8.15 to 9.50
No. 4 Glossy Coat	7.65 to 9.00
No. 1 Antique	7.65 to 9.00
No. 2 Offset	7.00 to 8.25
A Grade E. F.	6.80 to 8.00
A Grade Super	7.05 to 8.25
B Grade E. F.	6.25 to 7.50
B Grade Super	6.50 to 7.75
C Grade E. F.	6.00 to 7.00
C Grade Super	6.25 to 7.25
D Grade E. F.	5.70 to 6.75
D Grade Super	5.95 to 7.00
Ivory & India	.50 cwt. extra
Bonds (Rag Content)—	
100% Rag	39.10 to 46.00
Ext. No. 1	31.05 to 36.50
100% Rag	
85% Rag	23.60 to 27.75
75% Rag	20.50 to 25.00
65% Rag	17.55 to 21.50
50% Rag	14.65 to 17.75
25% Rag	1.00 cwt. extra
Regular Colors	3.00 cwt. extra
Heavy Colors	

	per cwt.
Bonds (Sulphite)—	
No. 1	8.60 to 10.50
No. 2	7.70 to 9.50
No. 3	6.85 to 8.25
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	12.25 -
Bleached (25 lb. up)	11.25 -
Unbleach (25 lb. up)	9.50 -
Greaseproof—	
Bleach. (25 lb. up)	9.25 -
Unbleach. (25 lb. up)	8.75 -
Ledgers (Rag Content)—	
100% Rag	40.25 to 47.25
Ext. No. 1	32.20 to 37.75
100% Rag	29.90 to 35.00
85% Rag	24.75 to 29.00
75% Rag	21.65 to 26.25
65% Rag	18.70 to 22.75
50% Rag	15.80 to 19.25
25% Rag	1.00 cwt. extra
Regular Colors	3.00 cwt. extra
Heavy Colors	
Ledgers (Sulphite)—	
No. 1	9.75 to 12.00
No. 2	8.90 to 10.75
No. 3	8.00 to 9.75

	per ton
News—	
Rolls (Contract)	50.00 -
Rolls (Spot)	(nominal)
Sheets	58.00 -

	per ream
Tissues (Carlots)—	
White, No. 1	.92½ -
White, No. 2	.60 -
Anti-Tarnish M. G.	.75 -
Colored	.87½ -
Kraft	.75 -
Manila	.60 -
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.46 -
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.52 -
Toilet, Bleached (M shts.) per cs.	5.80 -
Toilet, Unbleached (M shts.) per cs.	3.25 -

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.95 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	4.75 to 5.25
Super-Standard	4.12½ to 4.62½
Northern Standard	4.00 -
Southern Standard	3.50 -
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only)	5.75 -
(10,000 lbs.)	6.00 -
Drug wrapp. 35 lb.	6.00 -
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.25 -
No. 1 Butchers	4.50 -
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.875 -
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.625 -
Steam Finish, 50 lb.	3.625 -
Water Finish, 40 lb.	4.25 -
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	4.75 -
Envp. Mla., Sub. 16-28 (No. 2)	4.50 -
Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.00 -
No. 2	4.75 -
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	5.00 -
Grade B-25 lb.	4.75 -

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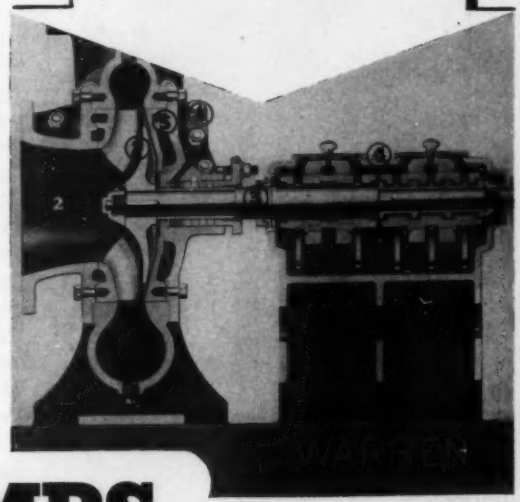

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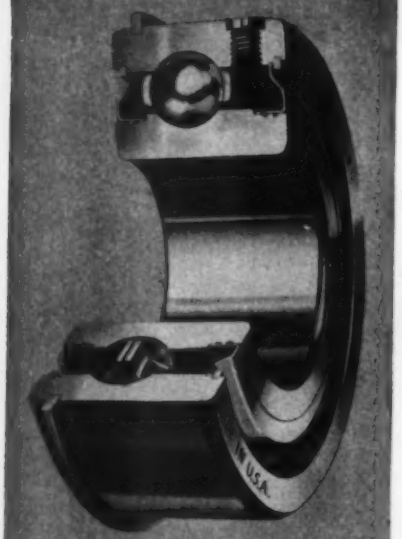

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Metal shields, though rigidly locked by snap rings, are removable to facilitate inspection, cleaning or re-greasing of bearings.

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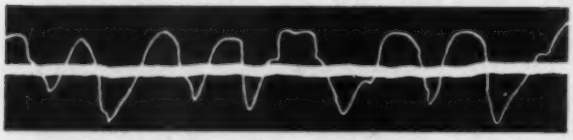

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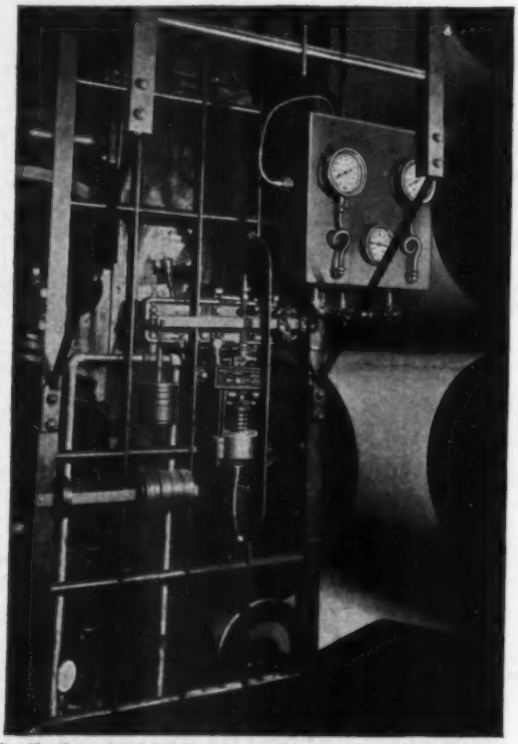

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